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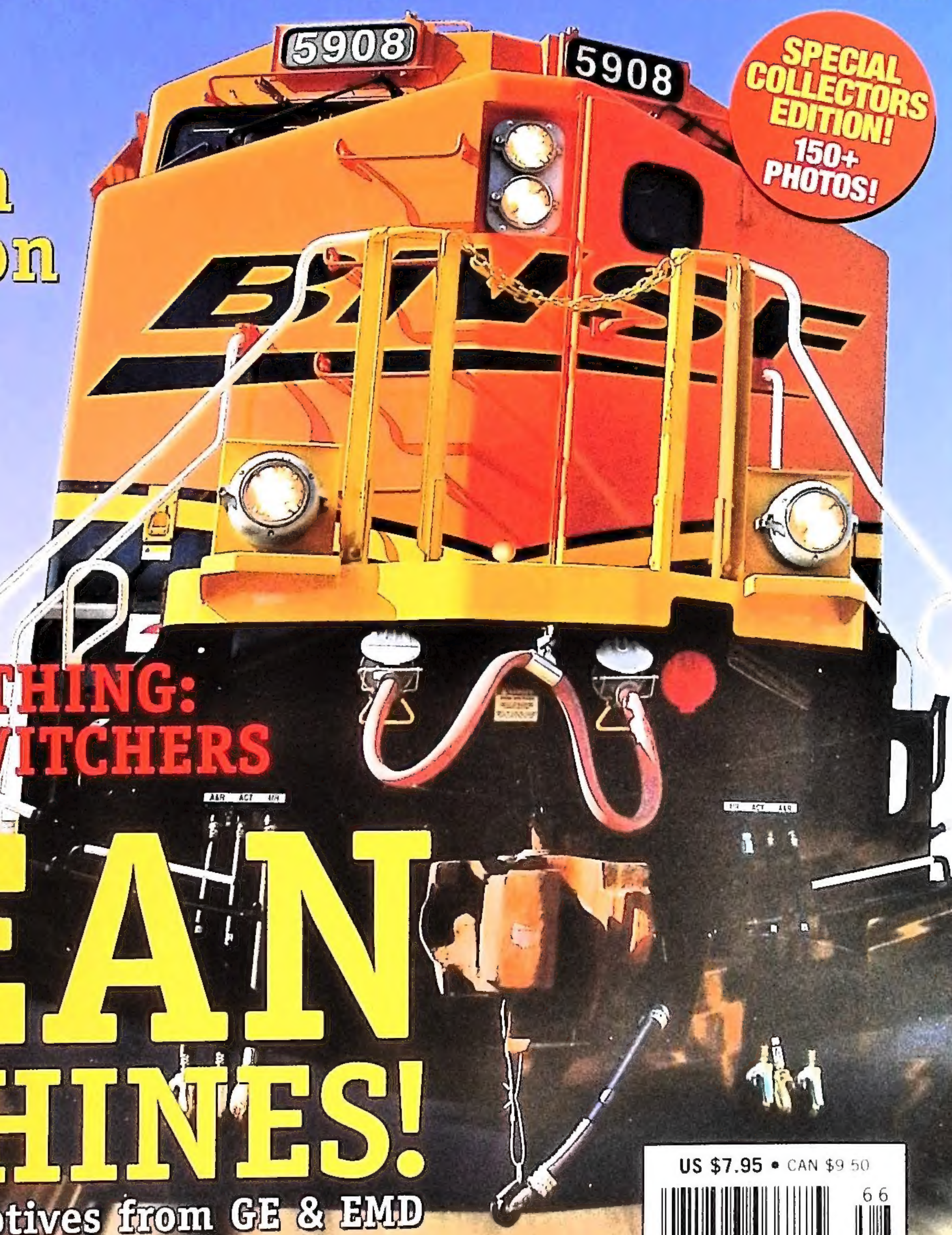

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THE MAGAZINE OF TODAY'S MOTIVE POWER

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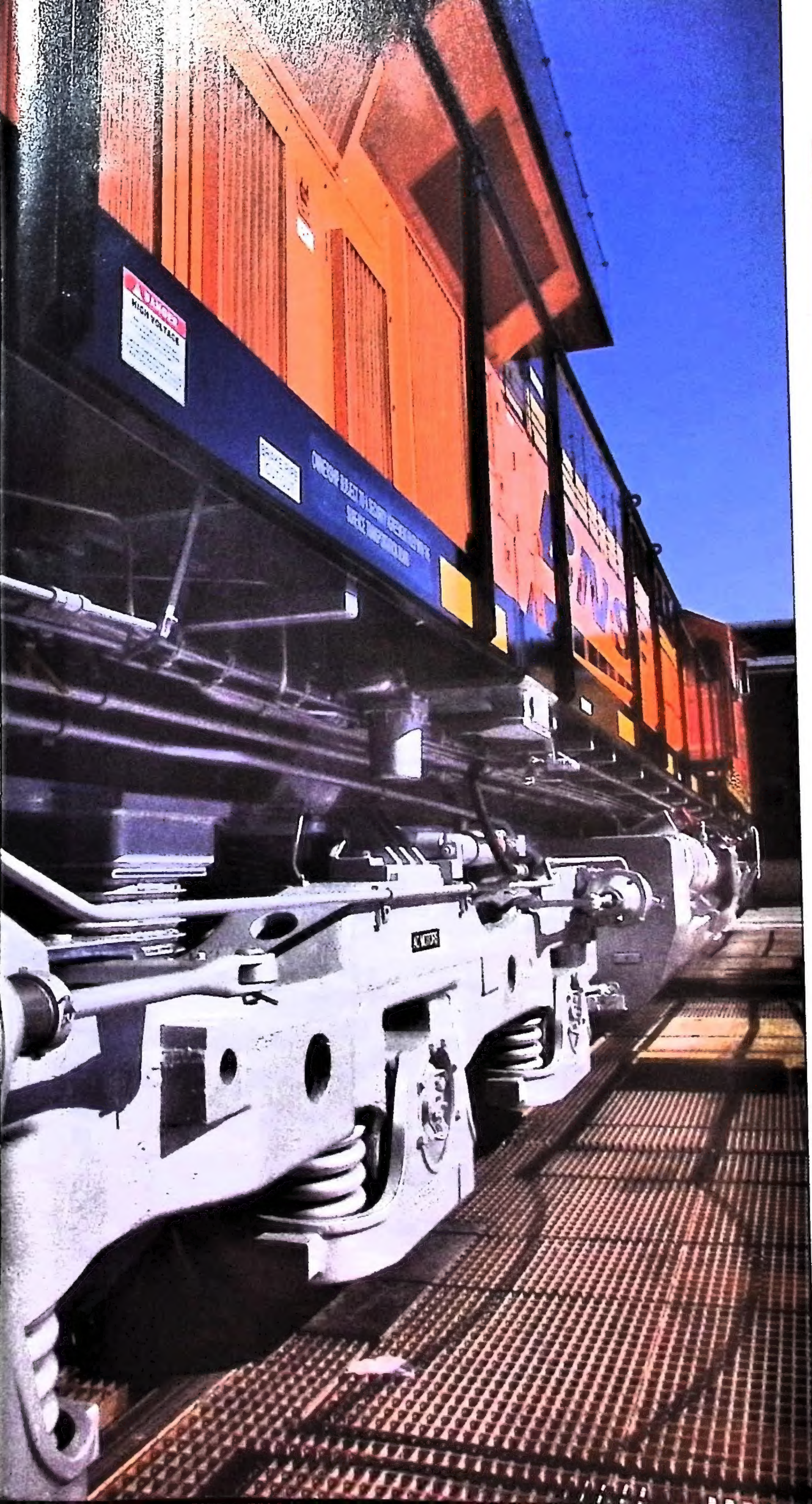

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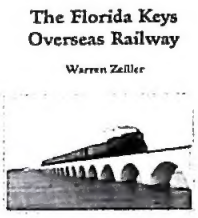

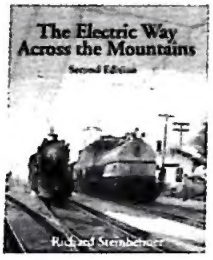

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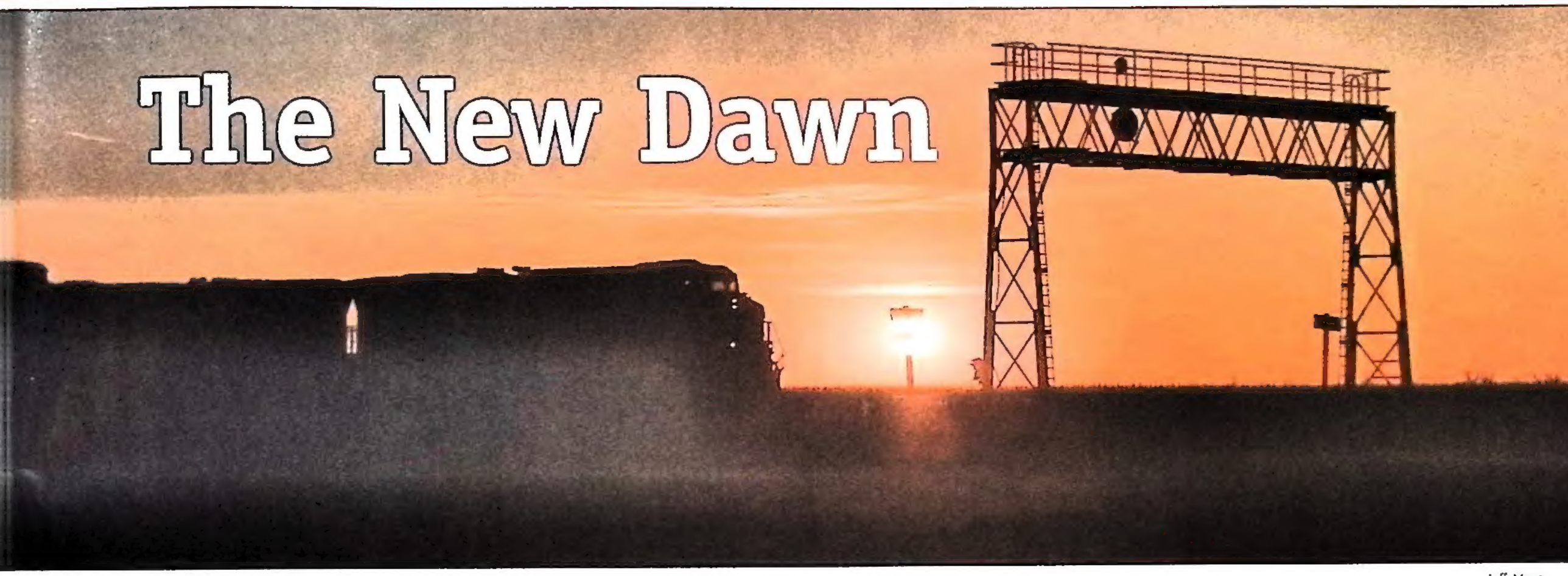
Editor's Notebook

The New Dawn



Jeff Mast

At the dawn of the diesel age, the need to reduce or eliminate smoke from locomotives — particularly in urban areas — helped kick-start the revolution that would dieselize North American railroads within a few short decades. It's no coincidence that Central Railroad of New Jersey 1000, the first commercially successful diesel-electric locomotive in America, went to work in the Bronx in 1925, the same year that New York City passed smoke abatement laws banning the operation of steam locomotives within the city limits.

More than 80 years later, we're back where we started. Locomotive emissions standards — smoke abatement laws by another name — are again a hot ticket. Again, they're helping to spark a new revolution in locomotive technology.

When the Environmental Protection Agency first released its "Final Emissions Standards for Locomotives," to take effect on Jan. 1, 2000, there were those who scowled that the laws would drag down locomotive performance and hog-tie advancements.

More visionary motive power men saw things in a different light.

"This will bring about a radical change in our way of doing business," said a respected source. Taking a lesson from the automotive industry, where emissions standards inspired gains in design and engineering, he predicted a challenging process that could well prove to be a "blessing in disguise." He was right.

Contemporary locomotives are leaner, greener, and meaner. General Electric has unveiled an all-new prime mover and a brand-new locomotive line. Its Evolution Series models have achieved major strides in emissions-reduction and fuel economy, and GE is working on a diesel-battery hybrid road locomotive. Newly independent Electro-Motive Diesel is touting its new 70 Series line and may yet embrace the four-cycle diesel.

For the first time since the bonanza days of dieselization, small builders and new players are entering the fray to produce brand-new locomotives for Class I carriers and commuter rail agencies. New — and not so new — players such as National Railway Equipment, RailPower, Alstom, and even Brookville Locomotive are challenging the big builders with bold new ventures: GenSets, Green Goats, and dual-modes.

Some of the concepts have been tried before. Remember New York Central's diesel-electric/third-rail straight-electric/battery-power box-cabs built by Alco and GE in 1929-1930? How about Baldwin's stillborn, 6,000-hp, 8-engine/generator-set 2-D+D-2 experimental? This time, of course, the technology is cutting edge ... some things just might be better the second time around.

The passenger locomotive, with avant-garde styling unseen for decades, is back. However, the No. 1 builder of North American passenger power is not one of the Big Two, but Boise-based MotivePower Inc., with a line of EMD 710-powered, MPXpress models that are the new standard. There's competition, though. New Jersey Transit has EMD-powered Alstom PL42s built in the former Erie shops in Hornell, N.Y., and the Connecticut Department of Transportation has commissioned Brookville Locomotive to build dual-mode commuter diesels to replace aging FL9s. And GE has a passenger version of its Evolution Series diesel on the drawing board, if not in the showroom.

The locomotive business in particular — and railroading in general — is as exciting as it's ever been. Already the most efficient and environmentally friendly method of transportation anywhere, railroading is becoming ever more so. The revolution has just begun.

It's the new dawn.

Greg McDonnell
Editor

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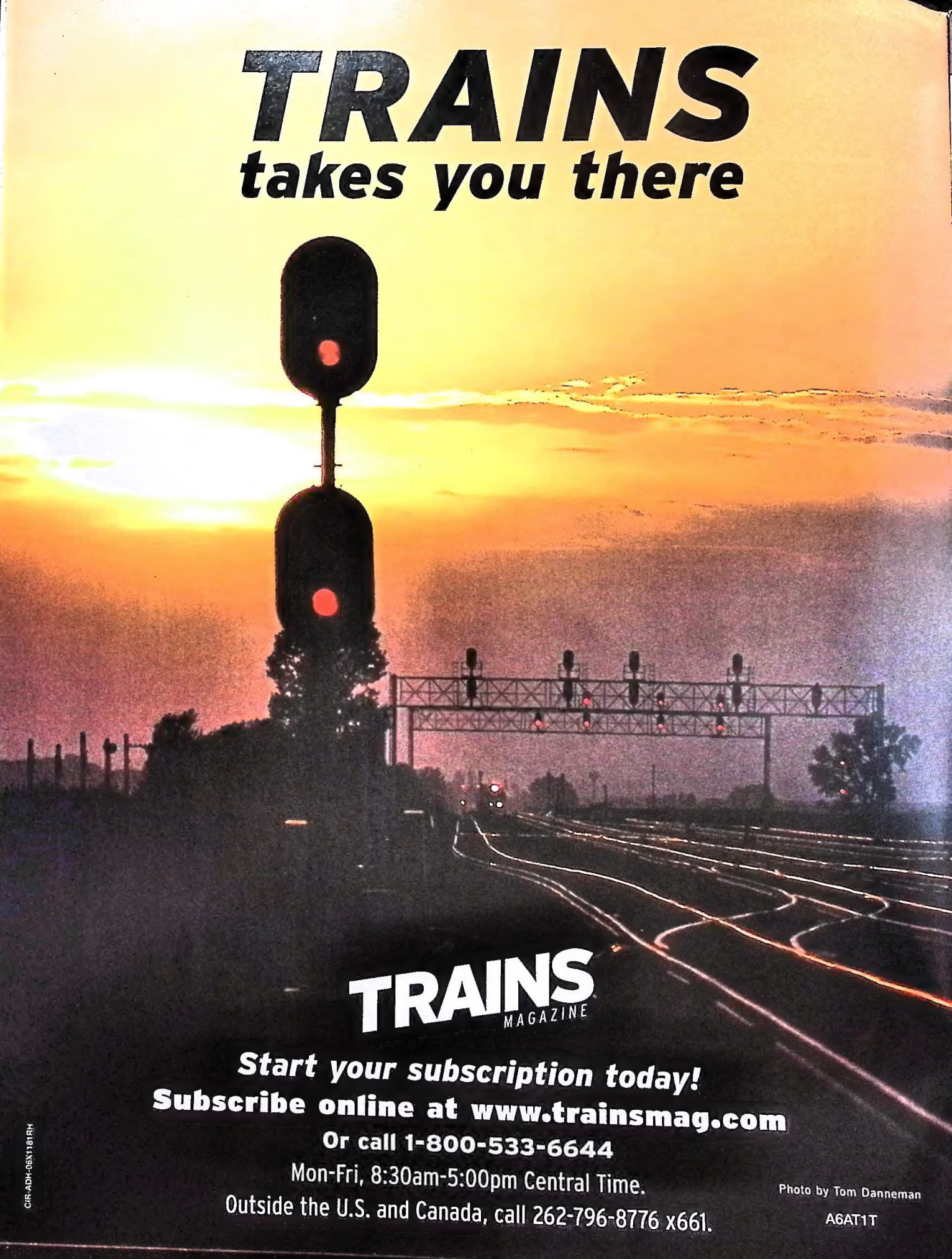

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Photo by Tom Danneman

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Life Expectancy

By Andrew Gregory

Life Expectancy. *The American Heritage Dictionary of the English Language* defines it as "the number of years that an individual is expected to live as determined by statistics." Insurance company actuaries calculate human life expectancies in order to determine policy premiums.

Actuaries probably are less interested in the lives of diesel locomotives. But early in the diesel era, 15 years was established as the average life expectancy for a new diesel by the railroads, the diesel builders, and lending institutions.

Many locomotives produced by some of the early smaller builders didn't live that long, either due to mechanical shortcomings or because they quickly had become oddballs in their owner's fleet. But, even taking that into account, the 15-year figure has proven to be overly conservative. Since the beginning, Electro-Motive Division locomotives tended to live the longest, usually serving well beyond their 15-year life expectancies. Among the most notable examples of a diesel model that has outlived its life expectancy are a handful of survivors from the small fleet of 60 EMD FL9s built for the New Haven Railroad between 1956 and 1960. FL9s were dual-mode—running as electric locomotives in New York City's tunnels and as diesels everywhere else. Such an unusual and complex design usually would ensure a short life. Remarkably, a small group of FL9s continue in daily revenue passenger service in 2006.

After the New Haven was included in the ill-fated Penn Central merger in 1969, FL9s continued to haul passengers for PC, Conrail, Amtrak, Metro-North, and Connecticut's Department of Transportation. By this past summer, six CDOT units (all wearing the colors they carried on the New Haven) and one MN engine kept busy in Metro-North commuter service substituting for their GE Genesis successors on former NH and New York Central branches in Connecticut and New York. Stripped of their third-rail electrical gear, they are straight diesels now, but still capable of maintaining 59-mph branchline speeds and 89 mph gallops on some sections of the main line.

On a June 2006 afternoon, 45-year old CDOT 2016 and MN 2008 are seen working home rails on the Waterbury Branch in Connecticut. Replacement locomotives designed to handle branch shuttle and work trains are on order from Brookville Equipment Corporation. But FL9s have exceeded the life expectancies predicted even by the most optimistic observers. So, don't be surprised to see them working for a while longer.

Timeless. Still on the job at age 45, New Haven-painted Connecticut Department of Transportation FL9 2016 wheels an evening Waterbury Branch train in July 2006.

Photo by Scott A. Hartley

5908
5908
BNSF

Evolution REVOLUTION

by Greg McDonnell

She's more than a pretty face

On a sunny March 2006 morning, BNSF ES44AC 5908 ventures into the light of day under her own power for the first time. Almost tentatively, she pokes her orange nose into the fresh spring air as Locomotive Test Leader Jim Pakiela eases her onto the transfer table outside Building 26 of General Electric's Erie, Pa., locomotive plant.

At first blush, she's little different from the legions of high-horsepower GE locomotives on the road today. Save for some paint and a few external details, there's little to distinguish her from the thousands of Dash 8s, Dash 9s and ACs that have emerged from Erie over the past decade and a half. Under the hood, it's another matter.

Meet General Electric's Evolution Series.

The first production locomotives to comply with Environmental Protection Agency Tier II emissions regulations, GE Evolution Series models, the 4,400-hp, A.C. traction ES44AC and its D.C. traction sister, the ES44DC, formally replaced the successful AC4400CW and Dash 9-44CW in GE's domestic catalog less than two years ago.

Tier II compliance is but a fraction of the Evolution Series mandate. "EVO" locomotives are part of GE's Ecomagination program, a company-wide initiative to create and market products and technologies "that substantially and measurably improve the environmental and operating performance of our customers." Among the first Ecomagination products in GE's global portfolio, the ES44 is a mean and, more importantly, lean machine. A new breed of power, the Evolution Series was born of a seven-year, $250-million program to develop "the most fuel-efficient, most environmentally friendly diesel locomotive in history."

Evolution. The branding is deliberate. GE emphasizes the technological bloodline linking the Evolution Series with its predecessor models, the locomotives that helped the company wrestle the crown from EMD in 1984, and hold the title of No. 1 North American locomotive builder for 22 years and counting.

"The best engineering involves knowing what not to change," says GE. From the venerable GE 752 D.C. traction motor and its A.C. counterpart, the GEB13, to traction control systems and air-cooled IGBT inverters, EVOs have inherited components and systems proven efficient and reliable by a generation of GE Dash 9s and ACs.

Nevertheless, it's what *has* changed that puts the Evolution Series over the top. That's about 50 percent of the locomotive, according to Len Baran, manager, North American Locomotive Products. Most of the changes, advanced engineering, new technology, components and control systems — including those significant enough to have generated 25 new U.S. patents, 13 patents pending, and 18 invention disclosures — are concentrated in the engine, cooling system, and control architecture of EVO locomotives.

Highlighting Evolution engineering is an all-new prime mover, the GEVO-12 engine. Like its FDL-series predecessor, the mainstay of GE locomotives for generations, the GEVO is a four-cycle power plant. The similarity ends there. With larger cylinder displacement, redesigned articulated pistons, strengthened connecting rods, a new high-efficiency turbocharger and four fewer cylinders, the 950-cubic-inch, 12-cylinder GEVO cranks out the same 4,400 hp as the 16-cylinder FDL ... all while consuming three-to-five-percent less fuel and reducing emissions by better than 40 percent.

Attempting to squeeze 4,400 horsepower from a 12-cylinder, locomotive-sized diesel would have been considered madness not that many years ago. But the GEVO-12 has accomplished just that, albeit, not without some of the expected developmental tribulations. Furthermore, GE engineers consider the GEVO-12's entry-level rating of 4,400 horsepower as conservative. The new prime mover, they say, has potential for increases in both horsepower and fuel efficiency.

Enhancing EVO performance is a revamped cooling system with a dual-fan, air-to-air intercooler augmenting GE's standard split-cooling radiator and fan configuration. The system lowers manifold air temperature up to 50 percent, providing a significant reduction in emissions while boosting efficiency and power. Evolution Series' beefed-up cooling system further reduces oil, water, and overall operating temperatures, improving reliability and extending service intervals and engine life.

Control architecture, the computerized system that is the brain of the locomotive, has been simplified, centralized and super-sized, with higher computing capabilities, expanded memory, improved diagnostics, and redundant networking. It all comes together in the cab, where "smart displays" provide crews with operational and diagnostic data — everything from brake-pipe pressure and locomotive speed, to on-board systems pressures and temperatures,

M. Ross Valentine

Tracing the Bow River west of Banff, Alta., CP ES44ACs 8743 and 8757 thread Morant's Curve on Canadian Pacific's transcontinental main line with a hot eastbound intermodal train on April 27, 2006.

tractive-effort data, and incident messages — through simplified, more reliable interfaces.

EVO, call home.

GE's "Remote Monitoring and Diagnostics Services" enable Evolution Series locomotives to transmit operating and performance data back to Erie by satellite through optional services such as GE's Expert-On-Alert system. Real-time monitoring and diagnostics, combined with predictive algorithms, pre-defined operating parameters, and fault conditions, enables the system to respond with automated repair recommendations direct to shop facilities in order to reduce road failures and speed repairs. In

addition, GE technicians with no small measure of expertise and experience provide 'round-the-clock advice on pre-emptive or corrective action, as well as coordinating effective repairs ... often without removing the locomotive from the train.

Other optional programs and equipment to increase efficiency and fuel savings can be integrated into EVO control systems. Add-ons include everything from Pinpoint locomotive tracking and monitoring, Consist Manager and Smartburn programs designed to minimize fuel consumption and adjust performance over the road, to AESS ("Auto Engine Start Stop"), which automatically shuts down an idling engine after the locomotive is stopped for a pre-designated period of time, then re-starts it on demand.

On a more basic level, ergonomics, cab-interior noise levels, and ride-quality issues also have been addressed. They're a good ride and "the quietest GE locomotives ever," says veteran BNSF engineer Keel Middleton of the ES44s of his acquaintance. It's where the wheels meet the rail, though, that Evolution Series locomotives truly prove their mettle.

All photos, Greg McDonnell

In a word, Evolution Series performance has been impressive: on the road and in the order books. Charged not just with meeting the challenges of Tier II compliance, but with improving fuel economy and reliablility and matching the success of its best-selling Dash 9 and AC44 predecessors, EVOs have made the grade. Reliability statistics are remarkable, operational savings are real, and sales are red hot.

All the Big Six roads — BNSF, Canadian National, Canadian Pacific, CSX, Norfolk Southern and Union Pacific, as well as Kansas City Southern/TFM and Mexico's Ferromex — have anted up for EVOs. BNSF, the only road to purchase both A.C and D.C. versions, has the lion's share, with 610 Evolutions on the road or on order. By year-end, UP's EVO fleet will total more than 300 ES44ACs, while Canadian Pacific, upon completion of its latest order, will have 140 ES44ACs. Norfolk Southern, sticking with its preference for D.C. traction and 4,000-hp locomotives, has 110 ES40DCs. CSX has 200 ES44DCs, while CN has 35. GE expects to complete approximately 850 locomotives this year, at least 700 of them Evolution models. Total Evolution deliveries are approaching 1,300, and GE anticipates more than 2,000 EVOs on the road by late 2007.

In keeping with GE's rich tradition of serving the export market, EVO is going global. The Chinese Ministry of Railways has inked a deal for 300 "mainline" locomotives powered by a 16-cylinder version on the GEVO engine targeted at over 6,000 horsepower.

Evolution Series locomotives — UP ES44ACs, CSX and BNSF ES44DCs, and ES40DCs for NS — take shape at Erie in spring 2006. (Upper, left to right) In Building 12, a completed BNSF cab is positioned for transfer to the Building 10 erecting hall. Meanwhile, in Building 10, an overhead crane lowers a BNSF platform onto air skids and workers install a GEVO-12 prime mover in a UP ES44AC. Viewed from above, CSX, BNSF, and UP EVOs line the shop floor, while workers examine BNSF ES44DC 5940 in the paint shop. Emerging from the paint booth (at left), freshly painted BNSF ES44DC 5940 is escorted onto the transfer table by a Bobcat. Cover girl BNSF 5908 (right) rides the transfer table outside Building 26.

Greg McDonnell

The granddaddy of all Evolution Series locomotives, GE A.C. V12 Tier II Prototype No. 2005 crosses a concrete-arch bridge on GE's test track at Harborcreek, Pa., on April 6, 2006.

Testing, testing, testing

On May 26, 2006, just 17 months after EVOs entered regular production, BNSF ES44AC 5972, the 1,000th Evolution Series locomotive, emerged from Erie. EVO sales statistics make it look easy, but the success of the Evolution Series has been seven years and several hundred million dollars in the making ... and it's still a work in progress. Even as the 1000th locomotive to carry the Evolution brand was ushered out the west gate of the Erie facility, GE 2005, the original EVO, was engaged in tests at the opposite end of the plant. "A.C. V12 Tier II Prototype" No. 2005 has been involved in exhaustive testing and development for nearly five years. She hasn't been alone, either.

Completed in March 2002, GE 2005 was the first of no less than 54 GE-owned preproduction Evolution Series testbeds — 52 of them painted and lettered for their host roads — fielded nationwide for revenue-service testing in 2003-2004. Union Pacific took delivery of five A.C. V12 Tier II Preproduction units in early 2003, followed by 30 A.C. Evolution Series Preproduction units delivered as BNSF 5718-5747 between August 2003 and January 2004. GE 2011, the first D.C. V12 Evolution Series Preproduction locomotive was completed in April 2003. In March 2004, 17 more D.C. Preproduction units hit the road on Norfolk Southern.

Trudging out of Appalachian coal fields with Tidewater coal, wheeling transcontinental intermodals through desert heat and mountain snow, lugging Powder River coal and export grain, hot manifests, and heavy drags, preproduction EVOs logged more than 3 million miles in revenue service testing in some of the toughest theaters of railroading. From Bluefield to the Blue Mountains; from Christianburg to Caliente; over Donner, Dragoon, and Cascade grades; from sea level to 7,000 feet; from 100-degree heat to 30 below, the testbeds took everything that BNSF, NS, and UP, gravity, Mother Nature, and the yardmaster at Oakland could throw at them, while GE engineers processed test data and real railroading experience to modify and refine the Evolution Series design.

The result is a locomotive that can combine Tier II emissions compliance with increased fuel efficiency, longer service intervals, and lower maintenance costs: a locomotive that lives up to its billing as the most fuel-efficient and environmentally friendly diesel locomotive in history. The result is the Evolution Series, a locomotive proving to be as revolutionary as it is evolutionary.

While Erie reaps the rewards of EVO victories, GE engineers are not resting on their laurels. As production workers labor around the clock to complete ES-model locomotives at the rate of one per shift, Erie engineers are at work on the next logical stage of EVO evolution: a hybrid road locomotive.

Based on the Evolution platform, the GE hybrid will

Howard Ande

William D. Miller

EVOs on the road. UP ES44AC No. 5383 leads an eastbound through California's Afton Canyon on March 20, 2005 (above), while CSX ES44DC No. 5348 and Ferromex SD40-2 No. 3140 pass B&O color-position light signals at Deshler, Ohio, with southbound train Q375 on May 6, 2006.

combine the GEVO-12 prime mover with 1,500 kw/h storage batteries capable of capturing and storing energy generated during periods of dynamic braking. This energy, about 2,000-hp for part of an hour, can be drawn upon as required to reduce the load on the diesel engine, or to provide a 2,000-hp boost in prime-mover output for short periods of peak demand.

The hybrid, GE predicts, will be capable of achieving an additional 15 percent saving in fuel consumption and a further 10 percent in emissions reduction over that of existing EVO models.

Gagan Sood, manager of the hybrid project, expects a prototype locomotive to be completed for local testing by the first quarter of 2007, and plans to be conducting road tests by third-quarter 2007. If all goes according to plan, a small fleet of preproduction hybrids will follow, and should be available to customers for extended road trials by 2008.

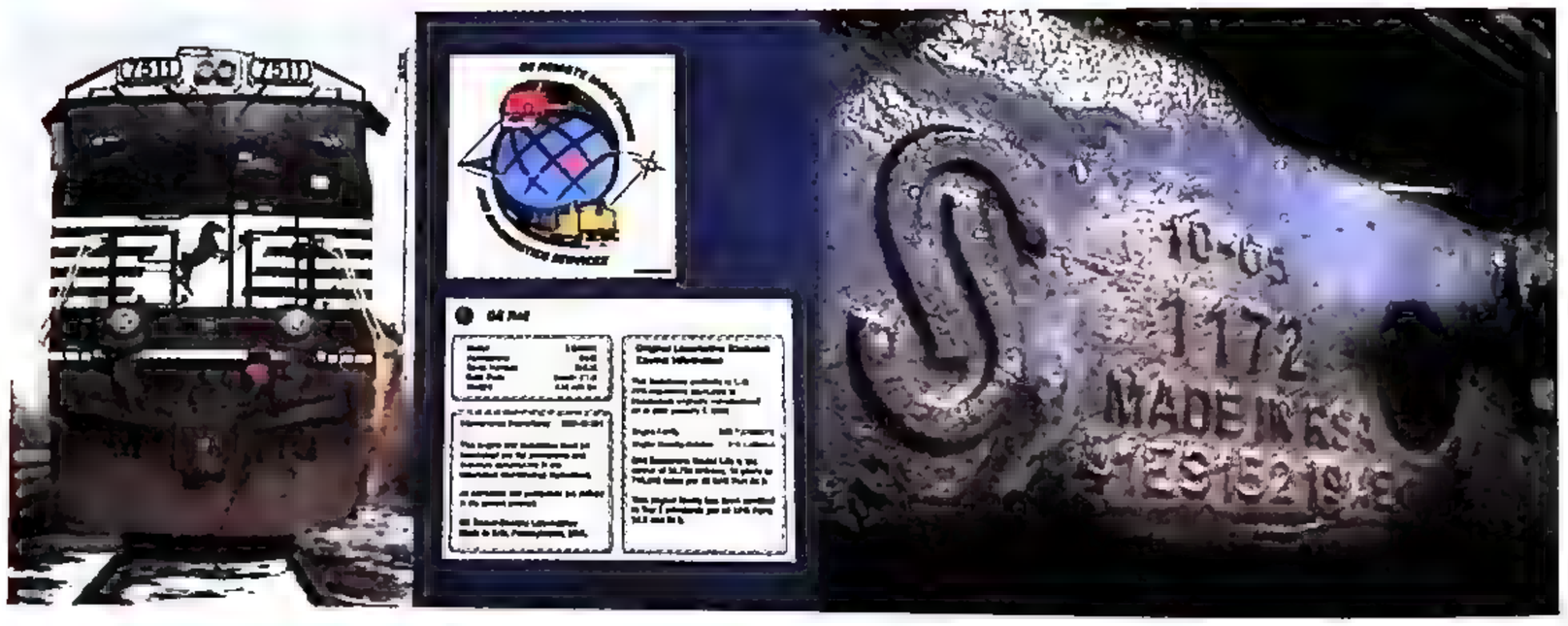
Welcome to the Evolution revolution. I

NEW POWER PROFILES

GE EVOLUTION SERIES

The Essence of Evolution

All photos, Greg McDonnell

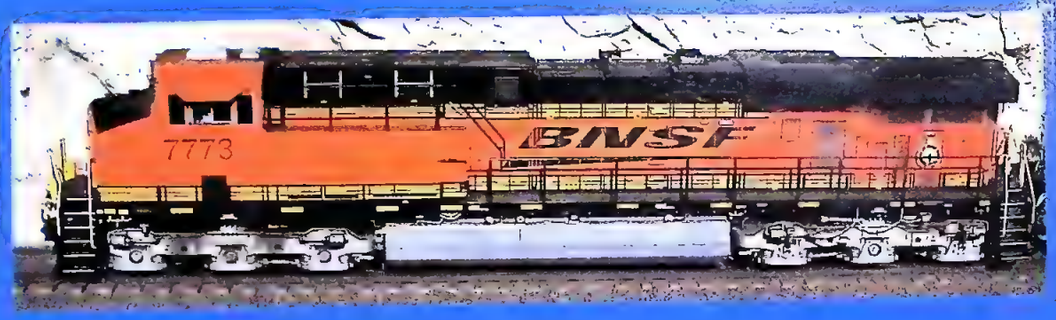


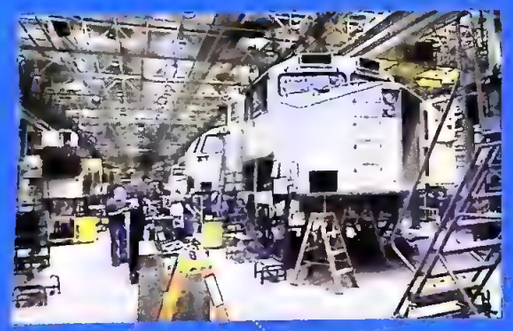
EVOLUTION SPECIFICS

	ES44AC	ES44DC
Engine	GEVO-12	GEVO-12
Traction motors	GEB13	GE 752
Traction horsepower	4,400	4,400
Maximum speed	75 mph	70 mph
Continuous tractive effort	166,000 lbs.	109,000 lbs.
Starting tractive effort	180,000 lbs.	142,000 lbs.
Adhesion	35 percent	29.5 percent
Dynamic braking effort	98,000 lbs.	78,000 lbs.
Weight	416,000 lbs.	416,000 lbs.
Length	73' 2"	73' 2"
Height	15' 5"	15' 5"
Fuel capacity	5,000 gals.	5,000 gals.
Oil capacity	450 gals.	450 gals.
Water capacity	450 gals.	450 gals.

ES44DC

Almost identical to ES44AC, including large box behind cab, previously present on AC models only. Note difference in air intake spacing behind cabs.



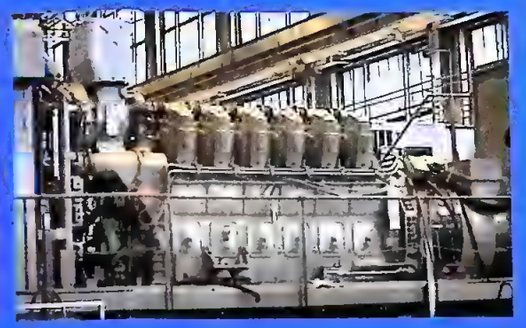


Main Cab

- Assembled Building 12, installed Building 10
- Smart display
- Integrated LocoComm wireless communications platform
- Smart panels, improved diagnostics

GEVO-12 Engine

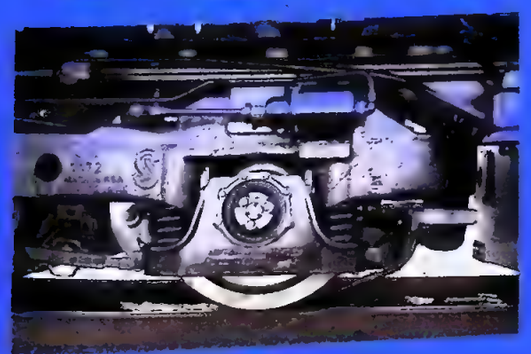
- Manufactured Grove City, Pa.
- Mated with main alternator (left) and installed Building 10



EVOLUTION: By the numbers

ROAD NUMBER	MODEL	QTY	DATE BUILT	NOTES
BNSF 5718-5747	AC Evolution Series Preproduction	30	Aug. 2003 – Jan. 2004	
BNSF 5748-5837	ES44AC	90	July 2005 – current	
BNSF 5844-6138	ES44AC	295	Oct. 2005 – current	Current order
BNSF 7605-7649	ES44DC	45	Oct. – Dec. 2005	
BNSF 7650-7799	ES44DC	150	Jan. – July 2005	
CN 2220-2254	ES44DC	35	Jan. – Feb. 2006	
CP 8700-8759	ES44AC	60	Oct. – Dec. 2005	Steerable trucks
CP 8760-8839	ES44AC	80	Current order	
CSXT 5200-5399	ES44DC	200	July 2005 – June 2006	
Ferromex 4600-4659	ES44AC	60	2006 delivery	Current order
GE 2005	AC V12 Tier II Prototype	1	March 2002	
GE 2011	DC V12 Evolution Series Preproduction	1	April 2003	
KCS-Mexico 4460-4589	ES44AC	30	2006 delivery	Current order
NS 7500-7516	DC V12 Evolution Series Preproduction	17	March 2004	Nos. 7500-7504 built as NS 9912-9916. Renumbered.
NS 7515-7609	ES40DC	95	Nov. 2005 – current	Current order
UP 5248-5553	ES44AC	301	Feb. 2006 – current	Current order
UP 5348-5352	AC V12 Tier II Preproduction	5	Jan. – Feb. 2003	Built as GE 2006-2008 and UP 5698-5699. Renumbered.

ES44AC



HiAd Truck

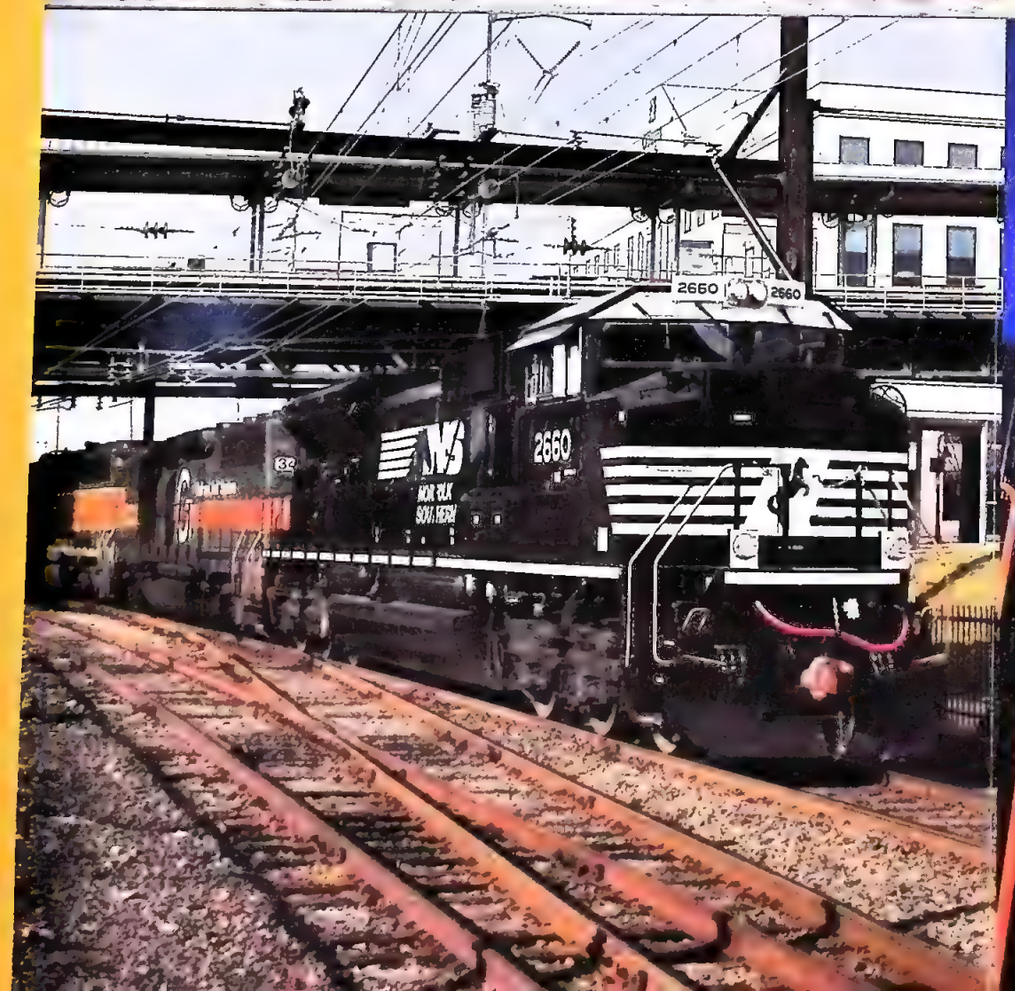
- Standard on all models
- Steerable truck
- Optional, shown above on CP 8704

Rad Cab

- Assembled Building 12, installed Building 10
- Air-to-air intercooler
- Split cooling radiator system
- installed Building 10

EMD 70 SERIES

Substance of the 70s



70 SERIES SPECIFICS

	SD70ACe	SD70M-2
Engines	16-710G3C-T2	16-710G3C-T2
Traction motors	A3432	D100
Traction horsepower	4,300	4,300
Maximum speed	70 mph	70 mph
Continuous tractive effort	157,000 lbs.	113,100 lbs.
Starting tractive effort	191,000 lbs.	163,000 lbs.
Adhesion	35 percent	28 percent
Dynamic braking effort	106,000 lbs.	86,850 lbs.
Weight	408,000 lbs.	407,000 lbs.
Length	74' 3"	74' 3"
Height	15' 11"	15' 11"
Fuel capacity	4,900 gals.	4,900 gals.
Oil capacity	420 gals.	420 gals.
Water capacity	275 gals.	276 gals.

For left, Robert Palmer
Left, Greg McDonnell

Mark Perry

Mark Perry

Mark Perry

70 SERIES: By the numbers

ROAD NUMBER	MODEL	QTY	DATE BUILT	NOTES
BNSF 9330-9399	SD70ACe	70	2006 – current	
CN 8000-8074	SD70M-2	75	2005 – current	
CSX 4831-4850	SD70ACe	20	May – Sept. 2004	
EMD 70-73	SD70ACe	4	April – May 2003	
EMD GM74-GM76	SD70M-2	3	Oct. – Nov. 2004	To CITX 140-142
FEC 100-103	SD70M-2	4	current order	
FXE 4000-4014	SD70ACe	15	2006 – current	
KCS 4000-4059	SD70ACe	60	Nov 2005 – current	
MRL 4300-4315	SD70ACe	16	May – July 2005	
NS 2649-2778	SD70M-2	130	2005 – current	
UP 8309-8523	SD70ACe	215	Jan. 2005 – current	See notes
Ferrminera Orinoco 1060-1063	SD70ACe	4	April 2004	Venezuela
Broken Hill Proprietry 4300-4323	SD70ACe	24	Aug. 2005 – current	Australia

NOTE:

UP 8379 renumbered UP 1982, MP heritage unit

UP 8383 renumbered UP 1983, WP heritage unit

UP 8396 renumbered UP 1988, MKT heritage unit

UP 8423 renumbered UP 4141, George H.W. Bush commemorative unit

UP 8521 renumbered UP 1989, DRGW heritage unit

UP 8522 renumbered UP 1995, CNW heritage unit

UP 8523 renumbered UP 1996, SP heritage unit

Greg McDonnell

An Engineman's Engine

Story and photos by Steve Bradley

She was just another locomotive when a shop worker at General Motors Diesel in London, Ont., fastened a polished oval builder's plate to her frame that day in May 1956. Quebec North Shore & Labrador No. 157, GMD serial A-936, was just one of hundreds of GP9s rolling off the assembly line at London. One of thousands, counting sisters emerging simultaneously from La Grange, Ill. When QNS&L No. 157 left London for Labrador, few in her presence would have guessed that 50 years later, she would still be in active service. Fewer still would have imagined that she would outlive many of the men who designed and built her.

Now, more than a half-century after QNS&L 157 first rumbled to life, I find myself climbing aboard for another day at her throttle. There's no doubt in my mind that she'll once again validate the claim of the General Motors promo man who labeled the GP9 "America's most versatile General Purpose locomotive."

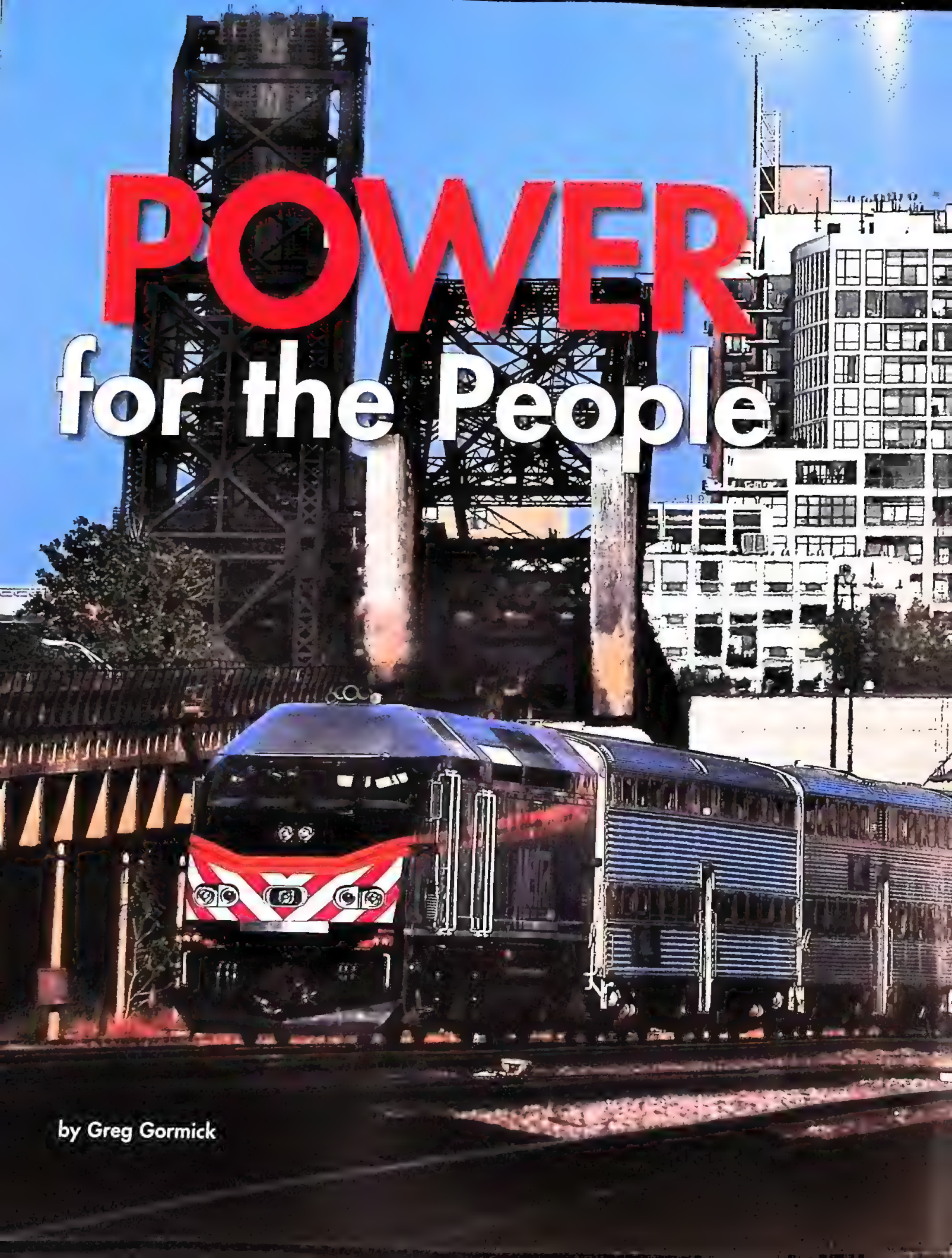
Her ore-hauling days over, GMD serial A-936 today earns her keep in regular freight and passenger service on the 34-mile Orangeville-Brampton Railway, a former CP Rail branch line west of Toronto, Ont. Formally identified as CCGX No. 1000, she works between OBRY's headquarters in Orangeville and its connection with the CP main line at Streetsville.

Remarkable for more than her longevity, CCGX No. 1000 remains pretty well original: no chopped nose, no remanufacturing, no electronic upgrades. Sure, her brake has been upgraded to a 26RL, and there's a radio set and tail-end device monitor above the control stand, but check out the barrel-style control stand, the large headlight controller, the distinctive load meter, and of course, the rope lanyard to operate the horn. Behind the electrical cabinet doors, the original wiring, contactors, and relays are intact. On the outside, her high hood and factory-installed straight handrails are untouched. About the only thing "new" about her are the ditch lights and her OBRY paint scheme. One monkey wrench, a screwdriver, some baling wire, and fuses make up the toolbox. No computer monitors or re-boot cards on this baby!

From the moment I push the start button to bring her 16-cylinder 567C engine to life, there's no doubt she'll give me her best. Whether she's kicking hoppers or spotting tanks, on her knees with northbound freight on the 1.9 percent grades, or cruising through the scenic Credit Valley with a passenger extra, No. 1000 is an engineman's engine. At age 50, she remains just as London built her, and just as General Motors promised: responsive, reliable, and versatile.

"The Pride of Orangeville" handles freight and passenger duties in the scenic Credit Valley south of Orangeville, Ont., in January 2006.

1000
1000
QBRY


POWER
for the People
by Greg Gormick

Elrond Lawrence

If you sold locomotives the way you sell automobiles, you'd have a showroom with your slickest models in the window. That would be today's slate of passenger locomotives.

"Hello Union?" Metra MP36PH-3S No. 404 works westbound train No. 1267 through the famed Union Avenue interlocking in Chicago, on Aug. 27, 2003 (left). Fresh from her Boise birthplace, Caltrain MP36PH-3S No. 923 (above) shows off her sleek profile at Burlingame, Calif., on April 4, 2003.

Howard Anda

Passenger power hasn't been this plentiful or stylish since the era that began in 1934 with the delivery of Union Pacific's M-10000 and Burlington's *Zephyr*, and concluded when the last "covered wagon" cab units rolled out of the erecting shops in the early 1960s. By comparison with the utilitarianism of today's freight units, the passenger ponies are positively intoxicating. There are now more than a dozen different types of diesel, electric, and dual-mode locomotives of recent vintage hustling the intercity travelers and daily commuters of North America. Juiced-up heritage rebuilds are still clicking off the miles. If that's not enough to keep the pro-passenger train watcher happy, just know that new models are on the way.

This new vogue in passenger power was born in the late 1980s when Amtrak started formulating plans for the replacement of its workhorse F40 fleet. The 3,000-hp F40 typifies that era between the decline of intercity and commuter service and the renaissance. The brawny varnish variant of the successful EMD GP40-2 helped turn the tide for Amtrak, VIA Rail, and many power-starved commuter agencies. Although its full-cowl carbody was certainly a nod to aesthetics, you'd be hard-pressed to call it pretty. Seduction in steel wasn't on the minds of Amtrak and EMD when the F40 was produced as a rush replacement for the ill-fated SDP40F, the previous freight-to-passenger mutant that had a bad habit of taking to the ballast at speed.

Not that the SDP40F was any prettier than its F40 successor — just bigger. Both were spiritual descendants of the FP45, instigated by passenger-proud Santa Fe in the days just before Amtrak. In the January 1971 issue

Scott A. Hartley

Distinctive by all counts, with her Vergara styling and New Haven "McGinnis" paint, Connecticut DOT dual-mode GE P32AC-DM No. 231 rolls into Waterbury, Conn., with Metro-North train 1948 in July 2002.

of TRAINS, veteran railroad communicator Wallace Abbey said it all: "Streamlined is hardly the word, somehow. But for good customer Santa Fe, EMD did manage to mask the rugged angularity of the SDP45 and produce a unit better coordinated with the *Super Chief*."

You could make similar comments about all the passenger locomotives that rolled out of La Grange, Ill. and Erie, Pa. in those interim years. In common with the aforementioned EMD passenger pullers (plus their GP40TC and GP40P units), the competition's U30CG, U34CH, and P30CH diesel-electrics were all just freight haulers in cheap clothing. So, too, was GE's E60 electric. Even the 7,000-hp ASEA/EMD AEM7, the mighty mouse that revolutionized North American passenger railroading under wires when Amtrak unleashed it on the Northeast Corridor, had about as much sex appeal as a Volvo from the 1960s. The fact that the 125-mph powerhouses are still called "Toasters" says it all. Ever hear anyone compare a Southern Pacific GS4 *Daylight* or a slant-nosed E6 to a kitchen appliance?

The transition from cloaking utility to promoting verve can be credited to three men: Amtrak President Graham Claytor, Vice President of Design and Construction Jim Michel, and Manager of Car Design Cesar Vergara. Now national design principal in the Manhattan offices of the global engineering firm, Jacobs — and currently at work on the M-8 electric multiple unit cars for Metro-North's New Haven Line — Vergara calls the Amtrak diesel project his once-in-a-lifetime opportunity.

"This was the first all-new passenger locomotive in 40 years, and it had to be a bold statement of this historic event," Vergara says. "When I started getting excited about this, it was Jim Michel who said I should sell the idea to Mr. Claytor. He opened the door and shoved me in."

Vergara's Vision

While Vergara wanted what would ultimately become the GE Genesis units to be outwardly triumphant, Amtrak was hunting for something that would be no less so internally, delivering:

- 1,000 more horsepower than the F40s without extra weight;
- Increased fuel efficiency and reduced emissions;
- Microprocessor-based operating and diagnostic technology;
- A.C. traction adaptability;
- A dual-mode sibling drawing 650-volt D.C. third-rail current in New York City's tunnels

"With all the advanced technology inside Genesis, I thought we needed something that said that on the outside," says Vergara. "Mr. Claytor was a powerful, but thoroughly approachable personality whose love of railroading and its history was legendary. I knew he'd understand what I wanted to do."

Vergara's arguments in favor of putting a new wrapper on Genesis won the day with Claytor, who must have been amused at Vergara's plucky promise to give him the credit if it worked and quit Amtrak if it didn't. Genesis did, of course, work.

"They're the backbone of our fleet for the long distance trains," says Mario Bergeron, Amtrak's deputy chief mechanical officer. "They're good performers, and they're out there doing exactly what we expect them to do. The dual-mode units haven't been quite as robust lately, given some sooner-than-expected replacement of the underslung reactors, which are involved in the propulsion mode transition. But we aren't having any trouble keeping the 14 base units we require on the road."

Workhorses though they be, the one aspect of Genesis that is still controversial more than a decade after its birth is its sleek styling. Vergara received poison pen letters decrying his design, yet he and many others stand firmly behind its artistic aspirations. One of them is Bill Vantuono, editor of *Railway Age*, who calls Vergara's work "one of the most-significant contributions to passenger railroading. He's passionate about its potential, and he wants to drive home the message by making people notice the trains themselves. He's re-opened the whole art of railroad styling, and that's influenced even the equipment he hasn't designed."

'My job is to make engineering look good.'

Vergara, who says one of his greatest influences was the work of muralist and fellow Mexican Diego Rivera, understands the strong reactions Genesis and all contemporary passenger stylings stir up. "No one taste is universal." But, he adds, "there's a certain group of people who want you to repeat the past and make a locomotive look like an E unit or a Sharknose. That would be sheer madness. Repeating even the most beautiful designs — and they were beautiful for their time — is a concept that's flawed to the core."

Vergara is an admirer of the locomotive work of legends such as Raymond Loewy, Henry Dreyfuss, and Otto Kuhler — especially Kuhler. But styles and forms have changed, and so has the locomotive building art. Genesis was bound by the confines of the manufacturing process, structural safety standards, and operating requirements, reinforcing Vergara's point that an industrial designer must always subordinate art to engineering.

"My job is to make engineering look good," says Vergara. "It's really Design 101: form following function. I had to work within specs that were already set, such as weight, clearances, and buff load requirements. It was suggested it be curved in front and make use of fiberglass or composite materials. I wanted it all steel and very tight, giving it a look of character with a nautical feeling, like a ship's bow. That produced a clean, somewhat Scandinavian look suggesting speed and strength."

Greg McDonnell

The backbone of Amtrak's long-distance fleet, Genesis GEs Nos. 186 and 178 pause under former Pennsy wires at Harrisburg, Pa., on Oct. 1, 2005.

The debate over Genesis and its effect on subsequent locomotive styling will probably go on until the day the last unit is retired, which won't be soon. It has become today's ubiquitous equivalent of the F40 in the intercity world, spreading from Amtrak to VIA in 2001.

But Genesis didn't repeat the F40's sweep in the commuter field. Although Metro-North, like Amtrak, went with the P32AC-DM dual-mode model as a replacement for its venerable FL9s, no one else bit. At 4,000 to 4,250 hp, Genesis was too much in one package for commuter operators running consists of less than about 10 cars. It also would have meant an expensive, disruptive shift from the EMD technology on which shop forces were trained.

So, EMD didn't get shut out of the passenger race. It didn't even get totally turfed from Amtrak because Genesis wasn't a panacea for all of its needs, particularly for shorter trains on emerging corridors. EMD had something that fit this bill, as well as that of commuter operators not dispatching lengthy trains with extreme traction and head-end power requirements.

Greg McDonnell

Credit Ontario's GO Transit for the F59PH, the quintessential commuter locomotive for a generation. Soon to be replaced by MPI MP40s, GO F59s gather in the service bays at the agency's Willowbrook shop as they await Toronto's afternoon rush in July 2006.

In 1988, EMD's Canadian division in London produced an all-new commuter unit to the specs of Toronto's GO Transit. The 3,000-hp F59PH used the 710G3 prime mover developed for the 60 Series road freight units, plus advances in control technology and HEP generation. It was a hit in Toronto and migrated to Southern California's Metrolink and Trinity Rail Express in Dallas-Fort Worth. But by the time of the Amtrak motive power replacement program, the basic design needed refinement.

Changing of the guard

What emerged was the F59PHI. Its most noticeable difference is its fiberglass-clad WhisperCab. The units have helped fill the needs of six commuter operators and Amtrak's state-funded services up the Pacific Coast and in North Carolina. They also brought some styling with them, thanks to the sloping windshields and pseudo-automotive noses.

But the F59PHI is now a dead product line. Genesis, too, is out of the catalog, and GE's replacement is a badger-faced mate for it. Dubbed the Next Generation Passenger Locomotive (NGPL) and unveiled in late 2005 as the passenger counterpart of the company's Evolution Series freight units, it uses the same GEVO power plant to meet Environmental Protection Agency Tier II emissions standards. GE turned to Vergara to style it. He's followed through from Genesis to produce an even sleeker carbody that rejects compound curves, which lead to production complications and costs. The artist's renderings reveal a slender dart that looks ready to slice the wind, not bash into it. Freight unit stylists, take note.

Svelte though it may be, there have been no takers for the NGPL. Like Genesis, there's too much under the hood for most commuter operators. VIA's plan to accelerate and massively expand its Quebec-Windsor Corridor services might have led to a sale, but a government thumbs-down killed that project and any need for additional power; VIA is poised for a midlife rebuilding of its F40s as running mates for its 21 Genesis units.

As for Amtrak, it's stuffed full of young power. Extra Genesis units were purchased in the mid-1990s for the proposed mail and express trains that were to be part of the so-called "glide path to self-sufficiency" — which was no such thing. The M&E dream scheme died in 2003 when then-new Amtrak President David Gunn revealed it to be a pipedream, leaving behind surplus power that is now available for lease to commuter operators.

So, with Erie having no luck and La Grange not cataloging a competitor, where is a passenger operator to turn? Try Boise.

From the plant where engineering giant Morrison-Knudsen Co., Inc., set up its locomotive rebuild business in 1971, and which has changed names and ownership too many times to recall, the customers' choice as the next generation of passenger power is rolling forth. Certainly the next generation of commuter power, at the least.

As MotivePower Inc., this division of multi-faceted rail supplier Wabtec is churning out its MPXpress locomotives for service from coast to coast and on both sides of the 49th paral-

Howard Ande

Racing toward the setting sun, Metra MP36PH-3S No. 407 leads an older F40PH on train 1319 at Naperville, Ill., on Aug. 14, 2004. Builder's plate detail (below), Caltrain 923.

lel. While some may be surprised by the rise of this challenger, the company's vice president and general manager says they shouldn't be.

"One of the first contracts won by the old M-K Rail Division was rebuilding locomotives for Chicago's forerunner of Metra," says Mark Warner. "We've done a number of commuter projects since then, so our passenger experience is, in fact, extensive."

Other M-K passenger projects that followed the rebuilding of the 21 ex-Burlington Northern Es for Chicago included the re-manufacturing of Delaware & Hudson's legendary quartet of PA1s, Amtrak E units and FL9s, and the conversion of six ex-Baltimore & Ohio F7s into F9PHs for Maryland DOT.

With the delivery of the last F40 to Metra in 1992 (the rakish F40PHM-2 "Winnebago" model), EMD cataloged the replacement F59. But its heftier price tag caused most transit agencies to balk. MPI stepped into the breach with an F40 clone program that mated recycled GP40 components with lengthened frames, full-cowl carbodies, and new passenger appliances. Miami's Tri-Rail got the first five in 1988, followed by three more in 1992. MPI has since built variations on that theme for Boston's Massachusetts Bay Transportation Authority, New Jersey Transit, San Diego's Coaster, San Francisco's Caltrain, and Altamont Commuter Express. But then the folks in Boise came up with a better idea.

"A couple of things moved us to take the lead in the development of totally new commuter power," says Warner. "First was the EPA's Tier I emission requirements for new locomotives, now upped to Tier II.

Elrond Lawrence

A digit of difference, but worlds apart: Caltrain F40PH-2C No. 922 waits with a southbound train as MP36PH-3S No. 923 speeds past with "Baby Bullet" train No. 368 at San Francisco's Bayshore station on June 9, 2006.

Elrond Lawrence

Next were the recommendations of the American Public Transportation Association respecting both crew and train safety standards. When Metra issued a request for quotes on an order for 27 new units, they required the incorporation of all those improvements. It was at that point that EMD withdrew from passenger development to concentrate on its core freight line."

MPI saw its opportunity and took it. The result was the 3,600-hp MP36PH-3S, of which the first was delivered to Metra in 2003. A six-unit order from Caltrain followed.

Among the most arresting features is the composite, steel-reinforced nose. More sculpted and rounded than the F59PHI's prow, it gives the machine a jaunty European look, as well as fulfilling its real function to be compliant with APTA safety recommendations. The new look of the MPXpress may make it seem like an "all-new" locomotive, but looks can be deceiving.

"The MP36 can be entirely new or it can use a remanufactured engine, traction motors, and other components," MPI director of engineering Rich Stengler says. "With 25 percent remanufactured components, there are cost savings and different EPA requirements, classified as Tier IIR."

Furthermore, both the units with remanufactured components and those using "out-of-the-box" subsystems have a connection to the past that is a strong selling point: genuine EMD parts. That, says Warner, has been a plus because "proven design is the common denominator among transit agencies. They don't want to deal with something they're not familiar with. They're familiar with EMD."

The blending of MPI's solid design with reliable EMD components has won friends. Caltrain banked its future on the six MP36 units and 17 Bombardier Bilevel commuter cars used to create its "Baby Bullet" express trainsets, aimed at cutting running times and boosting ridership and revenue on the San Francisco-San Jose corridor. The project was high profile — even somewhat controversial — with no margin for error.

"The MP36s haven't let us down," says Caltrain equipment manager Steve Coleman. "They've been strong performers on the Baby Bullet service and given us commonality with our EMD F40PH-2 and Boise F40PH-2C power. The MPI team came in on time and on budget, and even made five changes to the units without charge. That's a pretty good record to build on."

MPI is building in the way that matters most: an expanding order book. Five MP36s will power Albuquerque's new Rail Runner trains this year. In a joint contract inked in June, Metrolink and Utah Transit Authority's Front Range service (to be launched in 2008) will each take 11 units. Vancouver's West Coast Express will test drive one. The units are suitable for intercity use, and Amtrak has watched their development with interest, but just isn't in the market at the moment.

The big project now taking shape on the Boise shop floor is a 27-unit GO Transit order (with an option for 26 more) for the first run of the 4,000-hp MP40. GO's cost-effective plan to reduce crowding and handle the ever-increasing number of dashing

MPI is building in the way that matters most: an expanding order book

Dans and Danielles in the Greater Toronto Area is by upping its 10-car Bombardier Bilevel consists to 12. Not only is the 3,000-hp F59 fleet not up to providing the required traction and hotel power, it needs a midlife rebuild. That didn't make sense financially, nor did breaking GO's 39-year exclusive reliance on EMD power by purchasing GE's NGPL.

"The MP40s came about the same way as the F59s and the Bilevels," says Al Robinson, GO's director of equipment development. "We set the specs and let the bidders come back with their solutions. GE came close, but the MPI proposal still came out ahead."

To improve their chances for a successful bid, Stengler says MPI staff spent several days in Toronto, stopwatches in hand, timing GO's runs and studying the route profiles. This homework, he says, is key to "fully meeting our customers' needs technologically and involving them as much as they wish in our processes."

The first unit won't be on the property until late 2007, but GO is confident: "We'll be getting the proven virtues of the F59 with more power and a snazzier front end," Robinson says. "The MP40 will handle the new 12-car consists with higher acceleration and braking, reduced fuel consumption and emissions, and improved diagnostics. And the 710G3B engine and other EMD components gives us the same footprint in the

Greg McDonnell

shop. It's the right locomotive for us."

Others have decided that, too. Coupled to the 22-unit Metrolink/Front Range contract is a multi-agency option to spread another 45 locomotives, worth $120 million, between Front Range, Metrolink, MBTA, and the Minneapolis Northstar Commuter Rail Project.

"Each agency's needs are different and we pride ourselves on listening and working with them to provide the flexibility they require, says Warner. "That's what you have to do to be successful in what is clearly a niche market. But it's a growing niche market, and we intend on being the leader."

MPI is so much so already that only one diesel-electric purchase has gone elsewhere in the past five years. That was NJT's 33-unit rake of PL42AC units, ordered in 2001.

Greg McDonnell

Mixing Alstom engineering and components with EMD's 710 power plant and other gear, the 4,200-hp units were custom crafted to meet a variety of NJT-specific requirements lacking in existing diesel designs. Among these was a reduction in unsprung mass and wheel impact forces through the use of truck-suspended traction motors; they're axle-mounted on conventional North American locomotives. The revised, speedlined NJT paint scheme and the elegant styling of the SuperSteel of Schenectady monocoque carbody are the work of Vergara, who has created the railroad equivalent of the current chisel-snouted Cadillac line of automobiles and SUVs. In other words, daring and distinctively American.

And what of those rarities, the dual-modes and straight electrics? There's been action recently in those departments, too, and more to come. But they're so exotic they could and should fill articles all their own —especially the behind-the-scenes stories of what it takes to birth these disparate machines on a diesel-dominated continent.

Yet, they, too, possess the three hallmarks of today's passenger diesels: power, performance, and panache (whether you approve or not). This passenger-driven melange of "oomph" and "ah" is something the whole railroad industry is fortunate to have sitting up front in that imaginary showroom window. What Great Northern President John Budd said 53 years ago holds true: "The world judges the railways by their passenger services. If this is the window through which we are viewed, we must wash it and shine it, or else cover it with a dark shade."

Thanks to today's passenger power, the shade is rising and the washing has begun. 1

Mixing Alstom engineering, EMD engines, and Vergara styling, New Jersey Transit's newest diesels are 33 custom-crafted PL42ACs built by Alstom at Hornell, N.Y., in 2005. Returning from road trials on Western New York & Pennsylvania's ex-Erie main, NJT Nos. 4023 and 4024 pause by the Hornell depot on June 8, 2005.

Still Playing the Big Leagues

Story and photos by Elrond Lawrence

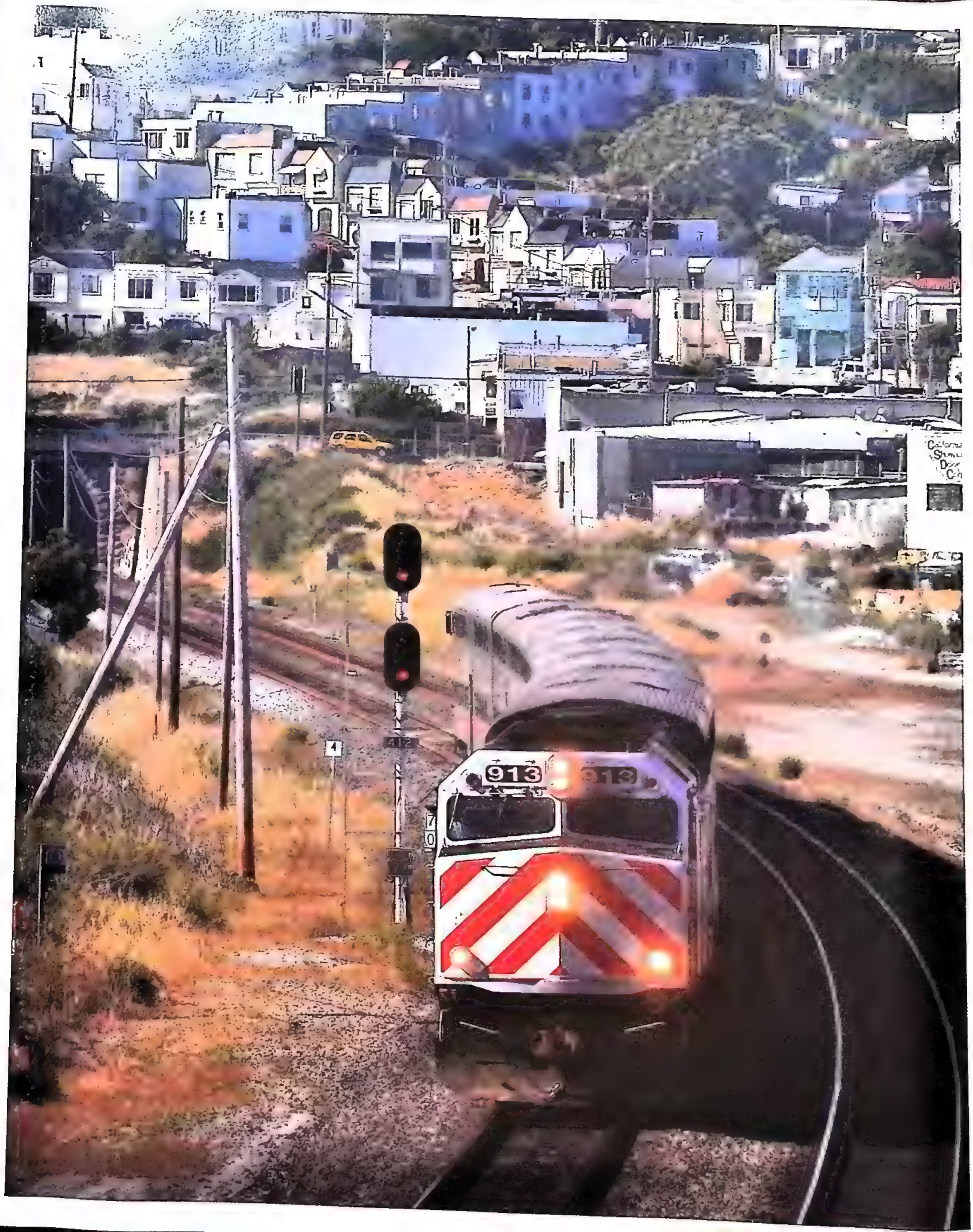
In the shadow of AT&T Park, home of the San Francisco Giants baseball team, the sleek, glass-lined Caltrain station on 4th and King Streets plays host to a twice-daily rush hour ritual familiar to all North American commuter rail-lines. What's not so typical in 2006 is the motive power. The backbone of the Caltrain fleet is formed by a group of 23 F40s, all earning their keep in the trade for which they were built: working "commute" service on the former Southern Pacific line between San Jose and The City by the Bay.

The F40's 21-year reign recalls the long tenure of another Peninsula power fleet, back when Willie Mays was wowing the crowds at Candlestick Park. From 1957 through 1974, the commutes were the domain of 16 Fairbanks Morse Train Masters. Sporting a long, husky profile and 2,400 horses, the Espee FMs muscled trains of Harriman coaches and bilevels until they were finally benched by SDP45s, GP9s and GP40Ps.

Twenty 900-class F40PH-2s arrived in 1985, pushing aside the venerable diesels that succeeded the Train Masters. Three additional F40PH-2Cs from Morrison Knudsen soon followed, and the fleet of stocky EMDs served as Caltrain's sole road power until April 2003. That month, the first of six elegant MP36PH-3C units debuted with matching trainsets to power the line's new Baby Bullet express service. Despite the arrival of new power, and an amazing modernization of the railroad's physical plant, the older EMDs roll on.

When they first came on the scene, the rookie F40s quickly established themselves as everyday workhorses for a new generation of passenger trains. Despised at first by fans, they ultimately became the face of Amtrak and every big-league commuter agency. But the next generation is steadily muscling in; like the Giants' Barry Bonds, the veteran F40s are playing in their twilight years. Yet what a show they've given the fans!

Framed by San Francisco hills and homes, Caltrain F40PH-2s Nos. 912 (above) and 913 (right) earn their keep in the trade for which they were built, working southbound commutes at Bayshore on June 9, 2006.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It Can Be Good Being Green

RailPower's Green Goat Grows Up

Story and photos by David Lustig

There is an old adage: If it looks like a duck, walks like a duck, and quacks like a duck, it's probably a duck

That makes sense. Unless, of course, you're looking at a Green Goat and believe it's a regular diesel. It's not.

A RailPower Green Goat is a hybrid locomotive. In contrast to a conventional diesel-electric locomotive, with a large engine and massive main generator within its long hood, the 2,000-hp Green Goat is powered by 320 lead-acid, 20-volt batteries, and a very small, 300-hp onboard diesel, which provides a continuous trickle-charge while the unit is idling.

Since the consensus among railroaders is that switchers and road-switchers assigned to yard work and light road jobs idle a majority of the time, the trickle charge from the onboard diesel is more than adequate in keeping the battery-powered units "topped off," thus making them more efficient than a regular unit while consuming less fuel. Statistics bear this out, with Green Goats regularly cutting diesel-fuel consumption 40 to 60 percent and emissions about 80 percent.

Classified by the company as a model GG20B — Green Goat, 2,000-hp, four axles — the locomotive is considered to be about 90 percent new. The two main exceptions are the foundation of the locomotive, a refurbished frame, and trucks provided by retired EMD and GE road-switchers. RailPower usually salvages a few pieces of the original long and short hoods. Everything else, including the control stand, cab, brake system, and wiring, is new.

The prototype, which was dubbed "Emerald" after the daughter of one of RailPower's founders, was assembled in the Vancouver, B.C., suburb of Westminster in 2001 in leased space at a local railroad's locomotive shop. The Canadian company has its corporate headquarters in North Vancouver, B.C., while its U.S. subsidiary is headquartered in Erie, Pa.

But those are facts and specifications. How does the unit do in actual railroad work? The answer, after the naysayers and "doubting Thomases" had their turn, is quite well.

After the prototype was ready to hit the demonstration circuit, it was sent to Roseville, Calif., near Sacramento, to perform long-term workouts on Union Pacific, before being sent to Chicago to test its performance in a Midwest winter. The railroad was impressed enough

RailPower demonstrator RPRX 2405 (above) on BNSF at City of Commerce, Calif., in May 2005; UPY 2004 at Commerce Yard, East Los Angeles, in March 2005.

RailPower has recently announced it is upgrading its line of hybrid locomotives

that through the Texas Emissions Reduction Plan, which finances much of the units' price tag, UP ordered dozens of Green Goats to replace conventional units in the Lone Star state on a one-for-one basis, a condition of the TERP deal. Another UP unit is currently working in Fresno, Calif. in the San Joaquin Valley.

TERP, and a similar state-run program in California have led UP, BNSF, and Kansas City Southern to embrace the Green Goat. However, many railroads and railroad operators have ordered them both with and without large financial incentives, including Amtrak, Canadian Pacific Railway, the U.S. Army, and industrial firms such as BASF, Dow, and RailServe, the last a locomotive leasing company.

RailPower has recently announced it is upgrading its line of hybrid locomotives and has just introduced the RP20BH. This model, considerably beefier then the original Green Goat, is designed for heavier yard

Goat graphic on RailPower "Emerald" demonstrator (above) and builder's decal on UPY 2004 (right).

assignments, branch line, and light-duty mainline assignments.

Sporting the same horsepower as the original GG20B, the unit incorporates two onboard 667-hp diesels that will produce more electricity to charge the storage batteries, the ultimate effect being the ability to supply more continuous power for a longer period of time. With two onboard diesels, full recharging time is expected to be much quicker. RP20BH production is slated for the SuperSteel plant at Schenectady, N.Y. The original Green Goat design will continue to be built by Alstom in Calgary, Alberta, and at Erie, Pa.

While establishing its reputation on the diesel hybrid Green Goat locomotives, RailPower has also decided to enter into the diesel GenSet locomotive market, as well feeling that there is excellent sales potential with railroads not certain that battery technology fits into their motive power needs.

Does this mean a slow curtailment of hybrid locomotives from RailPower?

Hardly.

The company has apparently realized that hybrid locomotives, while a sound technology design that has produced respectable sales, has strong, but limited appeal in the North American locomotive market. That said, management believes the hybrids will continue to make up to 10 to 15 percent of its overall business into the foreseeable future.

The size of that future, although stable, may fluctuate upward, as outside factors, such as the price and availability of diesel fuel and the hoped-for success of the new and larger RP20BH hybrid locomotive, play themselves out. ■

Goats in the L.A. Basin: Demonstrator 2001 keeps company with Los Angeles Junction CF7 No. 2563 and BNSF No. 1201, an MK-built LNG-fueled switcher (above). UPY GG20B No. 2004 switches at Commerce Yard, in East Los Angeles, (left), in March 2005.

554

The Baldwin Capital of the World

Story and photos by Robert S. McGonigal

When Matthias W. Baldwin began constructing steam locomotives at his Philadelphia plant in 1832, he probably didn't imagine that his company would become the nation's largest and most successful locomotive builder. But Baldwin's very proficiency with external-combustion machines left it ill-prepared for the diesel age, and the once-mighty builder turned out just 3,208 units — a poor third to EMD and Alco — before it threw in the towel in 1956.

Half a century after Baldwin built its last diesel, the idiosyncratic beasts are rarities even at museums and tourist lines — and virtually unknown on workaday railroads. Improbably, the largest concentration of Baldwin diesels is found on a network of tracks that did not even exist when De La Vergne diesels were being harnessed to Westinghouse generators and traction motors. The antiques work for SMS Rail Lines, established in 1994 to provide switching service at the Pureland Industrial Park in Bridgeport, N.J., just a few miles down the Delaware River from the city where Matthias Baldwin set up shop, and almost within sight of Eddystone, the Pennsylvania town to which Baldwin moved its works in the 1920s.

In a dozen years, SMS has acquired some 23 Baldwins, including the oldest extant example (VO660 No. 335, built as a demonstrator in January 1940) and the only known survivor of the Pennsylvania Railroad's vast fleet (DS4-4-1000 No. 302, originally PRR 9069). Other units claim origins as diverse as the U.S. Navy, Southern Pacific Railroad, and Warner Sand & Gravel. Most are switchers — always Baldwin's strong suit — but three are brawny six-axle AS616 road-switchers. Not all are operable, of course, and some never will be — they serve the cause as parts supplies to keep the others running.

Despite Chief Mechanical Officer Dave Hoffman's obvious fondness for his charges, SMS did not set out to be the Baldwin capital of the world. A couple of the good, rugged, slow-speed pullers happened to be available at start-up, then a couple more came, and soon Bridgeport became something of a magnet for Baldwins. The supply is limited, though, and SMS is expanding (besides Pureland, it has smaller operations at nearby Paulsboro, N.J., and at Morrisville, Pa.), so the carrier also has two EMD switchers on hand.

But the Baldwins are the backbone. A typical Monday at Pureland in May 2006 sees two fired up and prowling the 4.5 miles of trackage in the industrial park and out to the Conrail Shared Assets interchange. Doing the honors are AS616 No. 554 (ex-Trona 54, built for Kaiser Steel in 1952) and S12 No. 116 (a denizen of U.S. Steel's Michigan Limestone from her birth in 1953 until SMS got her in 1998). No. 554 is a sight to behold in SMS's green, Reading Co.-inspired livery. The 116 looks shabby in the tattered yellow and black of her former owner, but she's one of the best runners on the roster — "more grippy," engineer Jim Touldey says approvingly as his left hand darts from air throttle to 6SL brakestand.

For the better part of the day, the two burble their way around tight curves and between industrial buildings. Although they're more than 50 years old and just a stone's throw from their birthplace, the old gals are full players in the 21st century's global economy.

A stone's throw from their Eddystone birthplace, Baldwins gather on SMS Rail Lines at Bridgeport, N.J. on May 15, 2006. AS616 No. 554 tends to switching chores with S12 No. 116 (left) and mingles with S8 No. 102 and VO660 No. 6712 on the shop tracks (above).

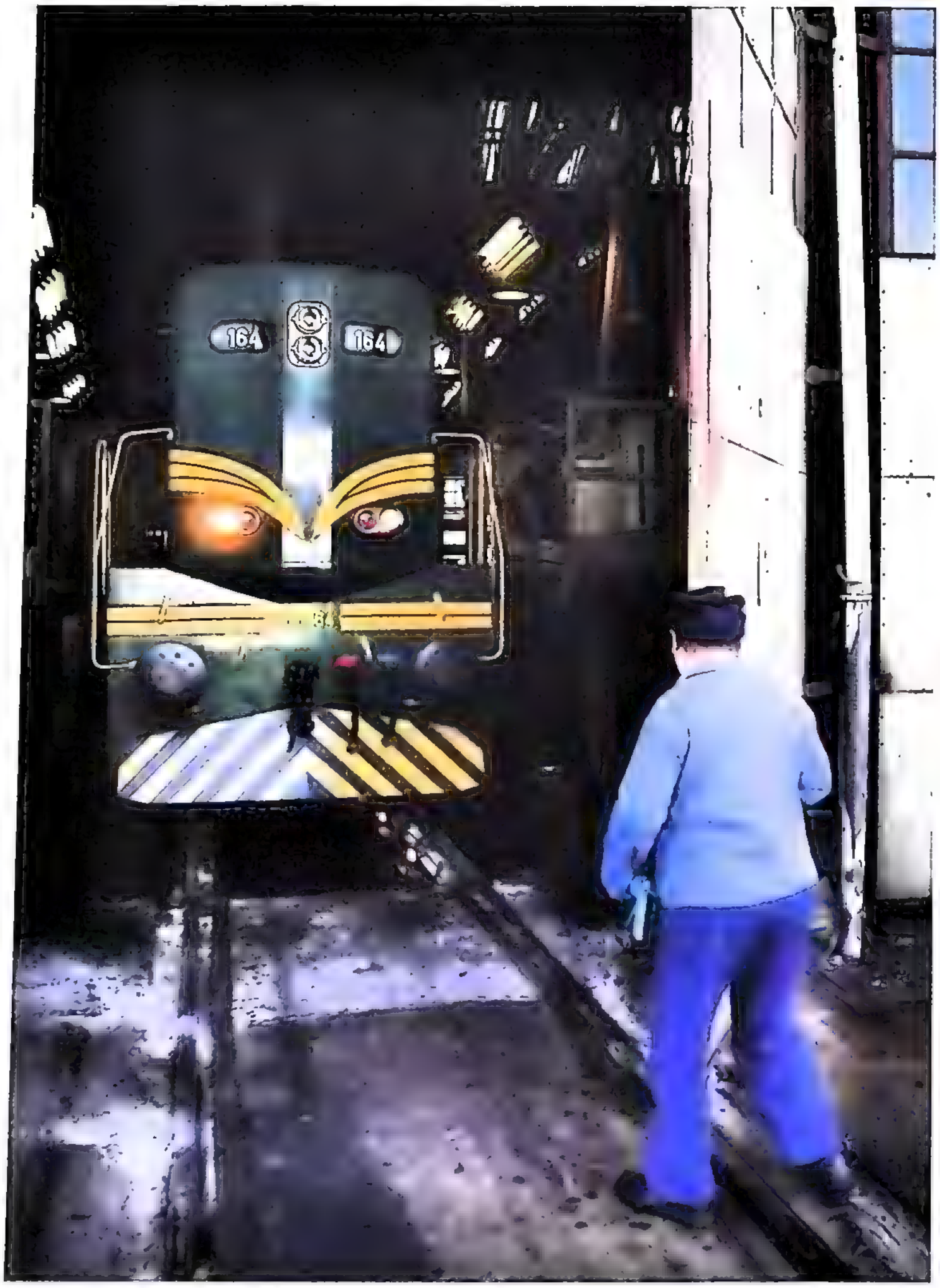
A Couple of Old Kennedys

Story and photos by Misko Kranjec

These 567s spoke any language. So wrote TRAINS magazine Editor David P. Morgan of the thousands of Electro-Motive diesels exported or built under license around the globe. A number of those 567 EMD prime movers spoke — and continue to speak — Slovenian.

Between 1960 and 1974, a total of 220 C-C, 16-567C-powered, 1,800-hp G16s — 131 from La Grange and 89 built by General Motors Diesel in London, Ontario — were delivered to Yugoslavia. More than 45 years after the first of these locomotives landed on European soil, at least two of their number soldier on in Slovenia, a longtime Yugoslav republic, which gained independence in 1991.

Slovenia, one of the smallest countries in Europe, is approximately the size of New Jersey, with a population of barely 2 million and a 770-mile national railroad system known as Slovenske Zeleznice: Slovenian Railroads. Headquartered in Ljubljana, the state capital, SZ carries nearly 15 million passengers and about 18 million tons of goods per year. Just under half of the total mainline trackage is electrified; the rest of the railroad is in the hands of diesels. What sets SZ apart from other European railroads is the fact that, with the exception of switchers, all of its diesels are of EMD design. Many of these units were built in La Grange, or by GMD in London. Others have been built under license in Spain, at the Macosa Factory in Valencia, and at the Croatian Djuro Djakovic plant in Slavonski Brod.



A mechanic at the Maribor locomotive workshops, opens the roundhouse doors as just-overhauled Kennedy 661-164 is prepared for a test run on Jan. 7, 2005.

Slovenian railroaders have a long tradition of using the nicknames they give to locomotive classes rather than referring to them by their official designation. When Slovenia received its first EMDs, nine La Grange-built G16s in 1961, the new American units, officially designated as Class 661, were quickly dubbed "Kennedys" in honor of U.S. President John F. Kennedy.

The dual-service, steam generator-equipped Kennedys were put to use hauling passenger expresses and

Late on a June 2005 night, Kennedy 661-032 awaits her scheduled 3:30 a.m. departure from Ljubljana with a manifest freight heavy with auto parts for the Renault plant at Novo Mesto. At right, Kennedy 661-164 shrugs off the snow as her engineer and the locomotive inspector have a brief conversation on the ready tracks at Ljubljana Main station after a short but intense snowfall on Feb. 24, 2004.

heavy freight trains on two of the toughest lines in the country: the mountainous Transalpina route, running along the Soca River and Italian border from Jesenice to Nova Gorica and Sezana, and the recently opened Koper line, linking the port of Koper with the rest of the Slovenian system. Both of these lines sport heavy grades up to 2.7 percent.

The Kennedys proved to be excellent performers, arguably, the best locomotives that SZ has had. In more than 40 years of service, they logged millions of miles, a most remarkable feat on a short-haul system where the longest diesel runs are less than 50 miles. Time has taken its toll. Of the original SZ Kennedys, four were turned over to Croatian railroads at the time of separation, one has been sold to a museum in Germany, and others have been scrapped, or sidetracked at the Maribor locomotive workshops, where they await an uncertain fate. However, the last two, SZ 661-032 and 661-164, have been recently overhauled.

With a bit of luck, there will be a couple of old Kennedys kicking around Slovenia for a few more years.

The Next Big Thing: GenSets

by David Lustig

Locomotive technology historically has been driven by the quest for stronger, beefier motive power with the ability to pull longer and heavier trains faster. In the 21st century, new parameters have been added to the mix

UPY 2005, City of Industry, Calif.

Both photos, David Lustig

While bigger, and presumably better, is still the motto of locomotive builders and railroads, two other factors have come in to play: fuel-efficiency and environmental standards. The latter, code words for locomotives that don't pollute nearly as much as their predecessors.

In many parts of the country, the days are quickly fading when locomotives can sit unattended overnight or longer, quietly idling and spewing pollutants in the air without consequence. Not only is it wasteful, but with the upwardly spiraling cost of diesel fuel, it is becoming at the very least economically unfeasible.

Heeding the call, at least two manufacturers, National Railway Equipment Co., and RailPower Hybrid Technologies are putting forth new solutions for railroads to consider. RailPower led the charge several years ago with the introduction of its diesel-hybrid Green Goat, powered by lead-acid batteries trickle-charged by a small onboard diesel generator. However, there's a new kid in town, the multiple-engine GenSet switcher.

GenSet locomotives are powered by two or three 600 to 700-hp truck-derivative diesel engines, each one packaged in a self-contained "GenSet skid set," comprising a diesel engine, generator, and radiator. For ease of maintenance, the skid sets can be easily changed out, reducing down time and maintenance costs.

The real genius in the GenSet concept is the locomotive's ability to use only the engines required for the work at hand. At idle, or working under low-demand conditions, a three-GenSet unit would have only a single engine operating, thereby

cutting pollutants and saving fuel by up to two-thirds. On demand, additional GenSets come to life as extra horsepower is required and automatically shut down when not needed. When the third "active" GenSet is idling for a specific period, it too shuts off, periodically restarting to keep systems functioning. To equalize engine wear, the choice of "active" GenSet is automatically rotated among the three.

Pioneered by National Railway Equipment and Union Pacific, the GenSet concept made its debut in late 2005 with the release of UPY 2005, a 1,400-hp, two-GenSet centercab locomotive. Officially designated 2GS-14B (two GenSet, 1,400-hp, B trucks), UPY 2005 was constructed at NRE's Mount Vernon, Ill. shop on the frame of a retired Southern Pacific MP15DC. The unique unit tested briefly in Chicago early in 2006 before moving west to Southern California for prolonged assignment to work out potential bugs and pave the way for triple-GenSet units still to come.

Hot on the heels of UPY 2005's arrival in the L.A. Basin, Union Pacific, quick to realize the great potential of the GenSet concept, announced a deal with NRE to build 60 2,100-hp GenSet locomotives.

Engines of change

NRE is marketing its GenSet product under the title of N-ViroMotive, a high-adhesion, low fuel-consumption, ultra-low-emissions locomotive, or ULEL for short.

Classed as 3GS-21B — 3 GenSet, 2,100-hp, B-trucks — the NRE units will have three six-cylinder Cummins QSK091 EPA Tier III off-road-compliant diesel engines, each rated at 700-hp, driving EMD D-77 traction motors. NRE has promised to deliver the first 30 units in 2006; the remaining 30 will follow in 2007. The 60 units will be assembled at NRE facilities in Mt. Vernon, Ill., and Paducah, Ky. All are scheduled for service in Southern California.

NRE is touting the modular design of its units as a boon to railroads looking to reduce maintenance downtime. The company says the units, thanks to their skid-mounted GenSets, can be back at work faster with its "remove the offending GenSet and slip in a new one" concept.

A harbinger of even greater things to come, UP is considering a six-axle, six-GenSet unit. Constructed on the frame of an EMD SD40, the unit is planned for hump work at Union Pacific's J.R. Davis Yard in Roseville, just northeast of Sacramento, Calif.

A logical extension of its Green Goat program, RailPower has also signed on to the GenSet concept. Indeed, RailPower was able to take the basic common architecture from the Green Goat and replace the banks of lead-acid batteries with three GenSets to create the RP20D GenSet locomotive. The guts of the unit is a trio of Tier III compliant German Deutz diesel engines rated at 667-hp apiece.

RailPower Executive Vice President Gary Eelman, who joined RailPower in 2003 and previously had worked for Helm Financial, Amtrak and New Jersey Transit, says the time was right for RP to develop its own GenSet technology.

Early sales are proving him right.

By July 2006, RailPower's RP20D GenSet locomotive — RP for RailPower, 20 for 2,000 hp, D for diesel — had logged more than 160 orders, and the trend does not seem to be tapering off. Eelman indicates that GenSet locomotive designs are being looked at by a variety of North American Class I and regional operators, not to mention industrial operations.

Aiming the RP20D right in the middle of the 2,000-hp EMD GP38/GP38-2 market, RailPower and Eelman believe their GenSet would be a perfect replacement candidate for the aging existing fleet of straight diesel-electrics. "Ultimately the Class Is will replace the GP38s," Eelman says. "It boils down to economics. The GP38 is probably the finest locomotive ever built for its time. And while it's well-loved, at the end of the day it's still got a big 16-cylinder prime mover. When a GP38 is running in the 8th notch it's efficient, but for anything else it's not."

Union Pacific and BNSF have already placed significant orders for RailPower GenSet locomotives. UP has signed up for 80 RailPower RP20BDs, while BNSF is in for five RP20BDs originally ordered as hybrid Green Goats. The units, funded by the Texas Emissions Reduction Program, will be used within the state at Houston, Dallas, Fort Worth, and San Antonio. The majority of the GenSet units will be built at SuperSteel's plant in Glenview, N.Y.

Given rising fuel prices, ever-stricter pollution controls, and the desire to be seen as a "friendly" neighbor, it could be only a matter of time before other Class I railroads climb aboard the GenSet bandwagon. Who knows? Maybe someday we'll be scouting around a railroad somewhere trying to find a non-GenSet unit to watch. 1

Engines of change. The original NRE 2GS-14B GenSet switcher, UPY 2005, shows off at UP's City of Industry yard in the L.A. Basin in January 2006. The center-cab, two-GenSet arrangement of this prototype is expected to be unique. UP has ordered 60 three-GenSet 3GS21B units of more conventional configuration from NRE and 80 RP20BD GenSets from RailPower.

Both photos, David Lustig

David Lustig

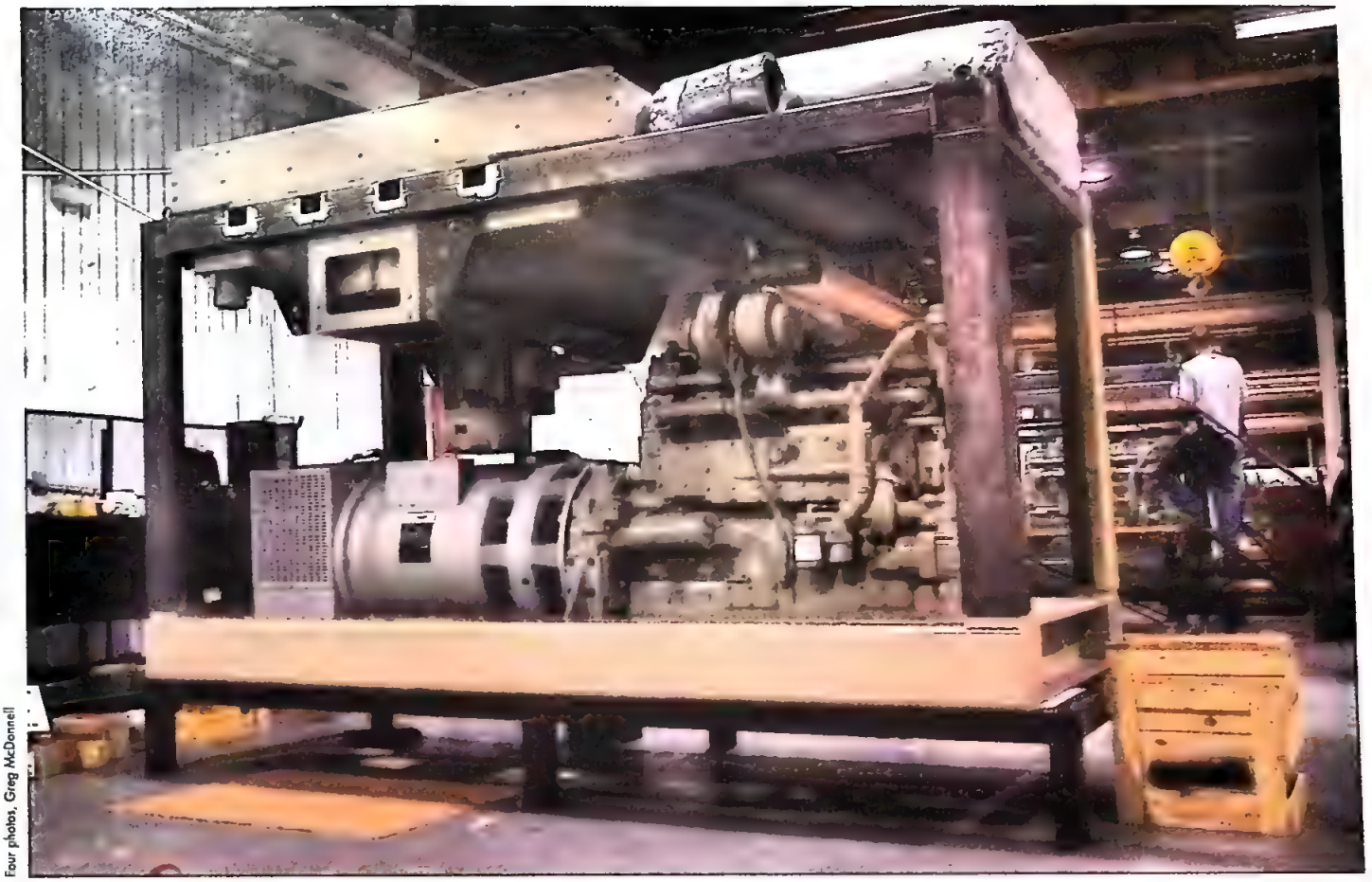
Opened hood doors reveal the GenSet skid-sets bracketing the cab of UPY 2005 (above); cab-side lettering forecasts the future.

GENSET SWITCHERS: By the numbers

ROAD NUMBER	MODEL	QTY	DATE BUILT	NOTES
BNSF 1220-1225	3GS-21B	6	On order	
BNSF	RP20BD	5	On order	
NRE	3GS-21B	1	Aug. 2006	Demonstrator
RailPower 5400	RP20BD	1	2006	Demonstrator
UP 2701-2760	3GS-21B	60	2006–2007	
UP 2005	2GS-14B	1	Nov. 2005	
UP	RP20BD	80	On order	
UP	RP20BH	18	On order	

GENSET STATISTICS & SPECIFICS

	NRE 2GS-14B	NRE 3GS-21B	RAILPOWER
Engines	Cummins QSK19	Cummins QSK19	Deutz TCG2015
Traction motors	D77 or D78	D77 or D78	D77, D78 or GE 752
Traction horsepower	1,400 (700 x 2)	2,100 (700 X 3)	2,000 (667 x 3)
Maximum speed	65 mph	65 mph	Not available
Continuous tractive effort	44,244 lbs.	43,847 lbs.	Not available
Starting tractive effort	79,417 lbs.	77,561 lbs.	Not available
Adhesion	30 percent	30 percent	Not available
Weight	265,000 lbs.	265,000 lbs.	Not available
Length	56' 2"	62'	As per core unit
Height	15' 5"	15' 8"	Not available
Fuel capacity	1100 gals.	2900 gals.	3000 gals.
Oil capacity	160 gals.	225 gals.	21 gals. per engine
Water capacity	100 gals.	150 gals.	23 gals. per engine



Four photos, Greg McDonnell

At NRE facilities in Mt. Vernon, Ill., workers assemble GenSet skid sets (upper) and wire electrical panels (left). The nose section for NRE 3GS-21B demonstrator awaits installation (center), while workers build frames for the UP production order.

Photo Section

Elrond Lawrence

At first light on a November 2005 morning, Genesis-powered Amtrak No. 4, the *Southwest Chief*, overtakes a waiting stack train led by BNSF Dash 9-44CW No. 4877. Moments later, the *Chief's* trailing express reefer clears, revealing a second eastbound, a grain train led by BNSF No. 4465.

M. Ross Valentine

David Styffe

Sunrise, sunset. Slicing through the early morning mist, CSX SD80MAC No. 808 and GP40-2 No. 6482 liven the tranquil dawn at Sleepy Hollow, W.Va., on June 27, 2004 (left). At last light on a May 2005 evening (above), northbound Amtrak *Pacific Surfliner* train 589, with F59PHI No. 455 in push-mode, prepares to depart Fullerton, Calif., on the home-stretch to Los Angeles.

Photo Section

West of Wendover, Nev., UP ACs — a pair of GE AC4400CWs bracketing an SD90MAC — work westbound coal near Ola Siding on the former Western Pacific main line in March 2006.

M. Ross Valentine

Photo Section

M. Rou Valentine

Ryan Parent

Working on the former Virginian Railway, NS Dash 9-40CW No. 9773 and several sisters cast their reflection in Slab Fork Creek as they lug West Virginia coal through Hotchkiss, W.Va., in May 2006 (above). One of the oldest EMD SDs still in regular road-freight service — and one of two former-Santa Fe "SD26" rebuilds left active on Guilford — Springfield Terminal 621 leads a trio of MEC Geeps out of Greenfield, Mass., with the westbound EDRJ on May 27, 2006 (right).

M. Ross Valentine

The Pilot Range Mountains shimmer in the distance as eastbound UP SD70Ms meet a westbound coal train in the charge of two SD90MACs and two AC4400CWs (one in SP paint) at Cliffside, Nev., on March 8, 2006.

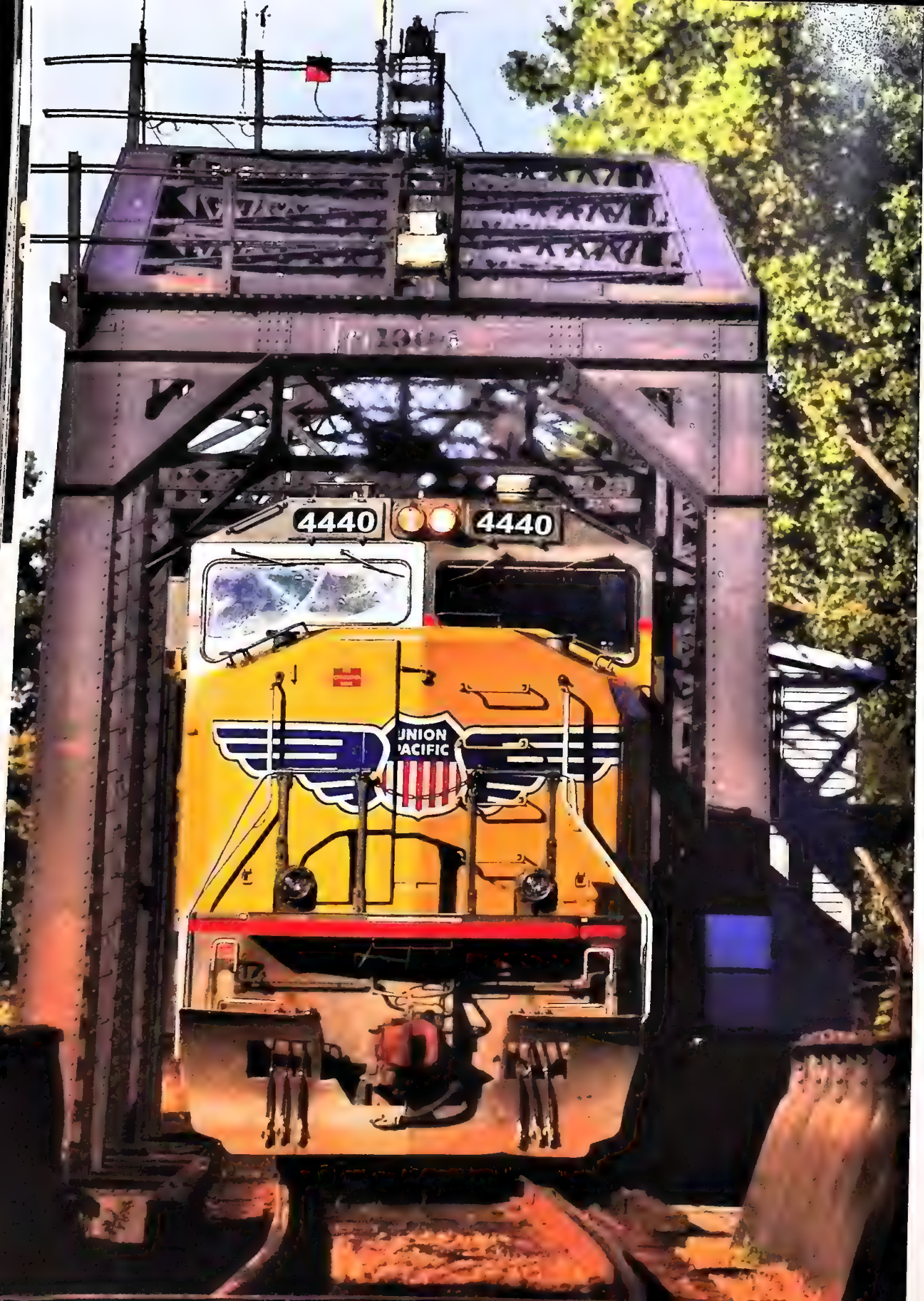

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Photo Section

Both photos, M. Ross Valent

Driftbusting. In Southwestern Ontario snow-belt territory, Goderich-Exeter train 581, led by GP38AC No. 3835 (above), breaks a trail through the drifts near Mitchell, Ont., in February 2006. Westbound on the former Pere Marquette, UP SD70M No. 4440 rumbles across the 1904-vintage swing bridge spanning the St. Joseph River at St. Joseph, Mich., with a CSX coke train on Oct. 9, 2005.

Look at EMD Now

by Greg Gormick

Daren Genau

Ever since the pioneering Electro-Motive Corp. became the Electro-Motive Division of General Motors in 1930, the initials EMD have meant many things to many people. Steam slayer. Industry saver. Market leader. Now, the 2,600 employees of today's EMD hope the initials mean Phoenix Rising

Just shy of the 75th anniversary of GM's purchase of the savvy Cleveland firm that, more than any other, ended steam's reign as the dominant form of propulsion in railroading, EMD ownership changed. It is now Electro-Motive Diesel Inc., acquired in April 2005 by Greenbriar Equity Group LLC, Berkshire Partners LLC, and "certain related parties." Included in the sale were EMD's North American and international locomotive, power, marine, and industrial products, spare parts and parts-rebuild business, all existing locomotive-maintenance contracts, and the integrated manufacturing facilities at La Grange, Ill., and London, Ontario.

Greg McDonnell

Mark Perry

Stars in the new EMD lineup are A.C.- and D.C.-traction 70 Series models: Brand-new BNSF SD70ACe units 9394 and 9397 at La Junta, Colo., on May 11, 2006 (above left); CSX SD70ACes Nos. 4845 and 4844 at Stratford, Ontario, Oct. 1, 2004 (left); and CN SD70M-2s Nos. 8017 and 8013 at Dauphin, Manitoba, Feb. 8, 2006 (above). Also in the catalog, the MPI-built GP20D (below) represented by CEFX No. 2011 at Dayton, Texas, on April 30, 2006.

Greg McDonnell

Many railroad observers of a historical bent have equated the severing of the GM-EMD relationship to a divorce or even a death in the railroad family. It was, after all, GM that was wisdom itself in recognizing the intertwined destinies of railroading and the internal-combustion engine. It was GM that had the bucks to send it down the rails. It was GM that truly made EMD's La Grange plant the "Home of the Diesel Locomotive."

But the "For Sale" sign had really been planted long ago, even if General Motors took it off La Grange's front lawn from time to time. Remember when the corporation shopped the division around in 1991 and then pulled it off the market two years later? So, this subsidiary striptease by GM came as no shock to insiders.

"Many people, including myself, thought that some type of ownership change was inevitable," says Steve Petracek, president of the Virginia-based Garibaldi Consulting Group, which deals extensively with railroad motive power matters. In addition to an impressive list of rail, marine, and aviation consulting credits, Petracek also served in various management positions at Burlington Northern, including manager of the operational field testing of EMD's SD60 A.C.-traction prototypes.

"EMD was not really part of GM's core business and GM had previously

Mark R. Lynn

In the company of aging SD45s, factory-fresh Montana Rail Link SD70ACe No. 4300 gets a bath at Helena, Mont., on Oct. 5, 2005. Norfolk Southern SD70M-2 No. 2714 (right) exits the east portal of the Musconetcong Tunnel on the former Lehigh Valley main line near Pattenburg, N.J., with Croxton-bound intermodal train 212 in May 2006.

spun off or sold a number of business units that were more closely related to their automobile business. GM had seriously investigated selling EMD, but the offers did not meet their expectations," he says.

The relationship with GM and the consequent past agreements with the United Auto Workers or Canadian Auto Workers labor probably also hurt EMD's labor productivity and cost competitiveness. But GM sold the division at a good time, "when the locomotive market was hot and EMD had a strong order book."

Whatever the background to the sale — very little was disclosed in the press releases — the deal is done and the new company wants to move on. The statements concerning the sale were succinct and upbeat, emphasizing the strengths of EMD's people, its designs, and its capabilities. Industry rumors are that EMD was sold for about $500 million and GM is one of those "certain related parties" not specified in the releases.

"I think everything the company wants to say about the new ownership was said in those releases," says Brian Grinter, EMD marketing director. "I can tell you that the people inside EMD are all very positive about it and equally positive about the market. Railroading is a growth industry and this is a good time to be a supplier."

With rising railroad tonnage and revenue — and its consequent justification for plunking down capital dollars for more and better equipment — the timing of the EMD sale certainly couldn't have been better. But that doesn't mean EMD is in for a comfy ride on the plush cushions of some dreamliner. Locomotive building is an intensely competitive field with few players and high stakes. It comes down to only two industrial legends slugging it out for their shares of the market that matters most: road-freight power.

EMD is, of course, the senior partner in that competition, but no longer the dominant one that it was for half a century. General Electric nudged EMD out of the top slot for the first time in 1983 and decisively captured the lead in 1990. Although the gap has narrowed on two occasions, GE has retained its lead, casting EMD in the unfamiliar role of contender.

"GE has been strong competition ever since they entered the diesel market with the U25B, even though that unit didn't equal what EMD then offered," says Tom Harley, retired manager of rail operations for LTK Engineering Services, one of North America's biggest rail and transit consulting firms. Harley had a ringside seat for the diesel slugfest for nearly 50 years. He started as a junior engineer with the Pennsylvania Railroad in 1949, and went on to occupy senior mechanical positions with that road and its successors, including responsibility for motive power.

"Everyone knew that, with GE's money, they'd work out their early

710 engine is very much at the heart
of EMD today. We've worked with and developed
the 710 for 20 years and one of the reasons
we stuck with it is reliability
2714
2714

Scott Snell

problems," says Harley. "It was obvious they were committed and willing to stay the course. That led to their big success with the Dash 8, which really overcame their reputation for being more expensive than EMD on parts and maintenance."

Harley also points out that GE's market breakthrough in the 1980s was coincident with EMD's replacement of its wildly successful Dash 2 Series with the 50 Series, which had problems related to upping the main crankshaft speed on the 645 prime mover to boost power. The SD50s and GP50s also suffered from electrical shortcomings. Harley and others say some railroads soured temporarily on EMD when it stumbled, giving GE the opening needed to surge ahead.

Additional and intertwined factors have been advanced for EMD slipping into second place. Among those raised repeatedly — and discussed extensively for more than a decade in the pages of TRAINS — are that GE had better financing, better delivery timeframes, and better fuel economy, plus the better quality cited by Harley.

But that's all history. And history doesn't sell locomotives. The EMD team today would obviously rather discuss current products and how they will help fill an expanding order book. In North America, the pillars of their forward-looking plan are the 710G3C-T2 prime mover and the two domestic freight growlers in which it beats in two-stroke rhythm, namely the SD70ACe and its D.C. sibling, the SD70M-2.

"The 710 engine is very much at the heart of EMD today," says Grinter. "We've worked with and developed the 710 for 20 years and one of the reasons we stuck with it is reliability. We are well over 800 mean days between failures, which is a phenomenal record."

The other critical reason EMD remained wed to the 710 is that the company's engineers correctly surmised that a two-cycle engine would respond well to the technology changes necessary to meet the Environmental Protection Agency Tier II emission standards, which kicked in on Jan. 1, 2005. GE's answer to Tier II requirements was the development of the 12-cylinder, four-stroke GEVO power plant for its also-new Evolution Series locomotives. The 4,400-hp units are available with either form of traction power as the ES44AC or the ES44DC.

EMD also believed that not having to deal with both a new prime mover and a new locomotive simultaneously would give them a superior product. No need to throw out something that had proven itself and still had more juice to be squeezed. More than 7,000 units of various models had already been delivered using the 710, and enhancements had previously taken it from Tier 0 to Tier I. The fact that it was already well known to shop forces was another good reason for the company to retain and refine it.

To meet the EPA standards, EMD engineers redesigned the combustion chamber, retuned the turbocharger and increased its aftercooling. The result is a 50 percent reduction in nitrous oxide emissions, which exceeds Tier II. Side benefits are that the 710G3C-T2 also meets European Union Stage IIIA emission requirements for 12- and 16-cylinder diesels (which take effect Jan. 1, 2008), and its marine version met the EPA

David R Busse

Exhibiting the angular "Dick Tracy" profile of the redesigned 70 Series, MRL SD70ACe No. 4300 (above) glistens in the autumn sun at Helena, Mont., in Oct. 2005. One of a half-dozen UP SD70ACe units given special heritage paint schemes, Rio Grande-painted 1989 (below) makes its debut at Denver, Colo., on June 17, 2006. The six units are adorned with specially created schemes that honor the heritage of roads merged into UP since 1982, including Missouri Pacific, Western Pacific, Katy, Denver & Rio Grande Western, Chicago & North Western, and Southern Pacific.

Dave Schaaf

standards two years ahead of the Jan. 2007 deadline.

EMD's edge

Another proven element held over from the earlier generation of SD70s is EMD's self-steering high-traction radial truck. This was one feature of those units that, many industry insiders say, was and is still superior to what Erie can roll underneath its offerings.

It is the combination of this improved 710 engine, service-proven elements such as the radial truck, and a host of recently advanced features that make up the new SD70 line, on which so many of EMD's hopes are pinned domestically. EMD personnel make it clear they aim to make it a universal freight hustler, applicable to everything from coal drags to merchandise trains to intermodal hot shots, over every kind of terrain. Suggestions that the new 70 Series is just a jazzed up, EPA-compliant version of the old line are false.

"The SD70ACe was not developed solely because of Tier II. That could have been done on any frame and within the same physical footprint," John Cavanaugh, EMD manager of locomotive sales and marketing, notes. "The real issue was the desire to offer additional technological and building block changes. There are many electrical advances that, with the new engine, make it a new locomotive, not a repackaged SD70."

The new cab has already brought praise from operating crews, who have never been thrilled by the "knee knocker" control consoles on the recent units of both builders. On the new 70 Series, the desktop approach has been banished and the layout rebuilt around a modified AAR control stand. The rearrangement of many appliances — radio and display screens, for example — eliminates a lot of the reaching crews complain about with the desktop. Forward vision has been expanded dramatically.

Both photos, Greg McDonnell

Undergoing pre-delivery testing on the Goderich-Exeter, CSX SD70ACe Nos. 4844 and 4845 stand at Stratford, Ontario, Oct. 1, 2004. "EMD's edge," the service-proven, self-steering high-traction radial truck, as detailed on CSX 4844 (lower).

Juan Garcia

South of the border, Ferromex SD70ACes Nos. 4002, 4005 and a UP SD90MAC grind through Torreon, Coahuila, on June 16, 2006 (above). Prompted by capacity issues at EMD's London, Ontario, plant, or by customer request, new units are often painted in contract shops. Painters at CEECO in Tacoma, Wash., put the finishing touches on KCS SD70ACe No. 4001 in December 2005.

Other significant bells and whistles EMD touts as giving the new SD70s superiority over previous incarnations and the competition are:

- Gen2 FIRE (Functionality Integrated Railroad Electronics), an on-board locomotive management system that improves reliability, safety and availability
- TechPro, an enhanced trouble-shooting assistance system that helps technicians isolate defective components by interpreting fault archive information
- Auto Engine Start/Stop, which is fully integrated with the EM2000 control system to reduce idling time and promises a potential fuel saving of 5,400 to 7,200 gallons per unit per year
- IntelliTrain, the optional cell phone and GPS monitoring system that relays data to the La Grange Locomotive Management Center for processing and instantaneous transmittal to designated railroad mechanical and operating personnel, giving them customized insight into what their units are doing at any time, any place, under any condition.

Even with all these goodies, the question remains whether the ACe and M-2 70 Series models will burnish the EMD reputation anew with those who decide which high-powered horses run on their steel courses. The beast has made a clean exit from the gate, posting sales of more than 500 units in less than two years. But critics still "tsk-tsk" at the news that Erie celebrated the outshopping of its 1,000th Evolution diesel in the same timeframe.

Both photos, David Lustig

Union Pacific photo

In tribute to Southern Pacific, UP's latest heritage unit, No. 1996, strikes a handsome pose in all her *Daylight*- and Black Widow-inspired glory at her Roseville, Calif., debut on Aug. 19, 2006.

'How could you not be impressed?'

Optimists are more inclined to point out that both of these steeds are young, the race has barely begun, and the 70 Series is just trailing before they hit the first turn. It's far from being some nag to be taken behind the roundhouse and shot. With the exception of Canadian Pacific (a once-loyal EMD customer that so far can't be budged from its romance with GE), every one of the Big Six roads has sampled it.

Other North American customers include Montana Rail Link, Florida East Coast, Kansas City Southern, and Ferromex. The new 70s have also found homes on such international mining roads as Venezuela's C.V.G. Ferrominera Orinoco C.A., and Australia's BHP Billiton Iron Ore Pty. Inc., which has ordered a low-clearance version designated SD70ACe/lc.

That some of these customers have already exercised their options speaks volumes. But trying to nail down buyers' views on EMD's status today is something akin to locating the Holy Grail. The railroad industry has become notoriously gun shy about discussing any of its suppliers' virtues and vices in public. Yet, the one customer who gladly endorses EMD today is the one that leads the field with the industry's lowest operating ratio: CN. "North America's Railroad" split its annual diesel order in 2005 between EMD and GE with 25 SD70M-2s and 50 ES44DCs, respectively. CN was pleased enough with its first sampling of EMD's new herd that it went back for a 50-unit follow-up order in June 2006.

"There were several things that made us go with the SD70M-2s," Sameh Fahmy, CN's senior vice president of mechanical, engineering and supply management, says. "First, we were reassured by the fact that there is a high degree of commonality with the previous SD70Ms, which have performed well for us. And we checked around with other railroads to find out about their experience, which had been good. Next, we could see that the new ownership was really working damn hard to deliver high quality. There's no question in my mind that they intend to be in it for the long run, so we were inclined to give them a chance."

Fahmy says CN's faith was well placed and, when there were some early glitches with the first rake of units, the railroad was even more impressed. EMD's new president, John Hamilton, told CN they'd set things right and, says Fahmy, "he put his work boots on and showed up in our Edmonton shop with his best technical people. How could you not be impressed?"

One race in which both EMD and GE have enjoyed something less than stellar success is the 6,000-hp sweepstakes. Both fielded high-horsepower brutes, spurred on by the carriers themselves. EMD's SD90MAC and GE's AC6000CW sold in only minor quantities. No one is expecting that to change anytime soon.

"Besides price, the size of the market for 6,000-hp will depend on achieving super levels of reliability required for single-engine train operation since a large percenage of non-unit trains currently are powered in the 5,000 to 7,000-hp range," says consultant Petracek. "Increasing train sizes would support the market for 6,000-hp engines, but many railroads perceive the 4,000- to 4,400-hp package to be more flexible."

But that doesn't mean the non-traditional, four-cycle 265H engine EMD developed for the SD90MAC is back in the barn. "It is alive and well and part of our product mix, even though the North American market pushed back from the whole idea of a 6,000-hp, single-building-block locomotive," Cavanaugh points out. "The H-engine is still in development and will be used at 6,000 horsepower for China."

Greg McDonnell

Still in the catalog. EMD's GP20D is the only medium-horsepower switcher/road switcher offered by the big builders. Powered by a GM 16V170B20-T2 engine, the Tier II-compliant GP20D is built by Motive Power Inc. CIT Financial's 40 lease-fleet GP20Ds are among the few built thus far. Leased to UP, CEFX 2011 and 2003 work at Dayton, Texas, in April 2006.

It is in the export race that EMD has remained robust throughout the domestic market share war. In fact, the company has been a powerhouse in the international market, where there are multiple builders and the competition can be even more down and dirty than at home.

Like virtually every other Western maker of virtually every exportable technology, EMD is chomping at the bit when it contemplates what could flow from the Chinese contract to which Cavanaugh refers. The Chinese market will likely take a minimum of 6,500 main line replacement diesels over the next 15 years. EMD's first entry in that derby is coming through a co-production deal struck in Sept. 2005, with the Chinese Ministry of Railways, and Dalian Locomotive Works for the production of 300 JT56ACe units using a 16-cylinder H-engine and A.C. traction. In what is known as an "indigenization agreement," EMD designs will flow to China and the first 10 units will flow out of Dalian in the third quarter of 2007; the order will be completed by the end of 2009.

Not unexpectedly, GE also has its entry. In a virtually identical deal with the Ministry of Railways, GE will deliver an equal number of 6,000-hp units using a 16-cylinder version of its GEVO engine. They'll be produced in a co-production deal with Qishuyan Locomotive and Rolling Stock Works for delivery at the same time as their EMD competitors.

China rising

"China dwarfs just about every other market you can mention," says EMD Manager of International Marketing Scott Garman. "We've had an office over there for seven or eight years and the payoff is this first contract. We obviously expect it won't be the last."

Elsewhere in the export field, EMD is in the winner's circle with its Continental workhorse, the JT42CWR , better known in the United Kingdom as the Class 66. Some of the credit for the popularization of the 3,000-hp unit can be attributed to the visionary Ed Burkhardt. He settled on it in the late 1990s as one of the hooks he would use to drag the Brits into the world of North American-style freight railroading with his takeover of the former BritRail freight business under the English, Welsh & Scottish colors. By the end of 2006, EMD will have delivered about 500 Class 66 units for service in the U.K. and Europe.

Garman refers to the Class 66 as "the export equivalent of the SD40: The dominant modern diesel locomotive in the markets it has penetrated with lots of room for growth into other countries that need flexible, low-cost power. And that market is not restricted to Europe. It's got global potential."

The next EMD Continental invasion will come with the Euro 4000. In Europe, freight trains that gum up the passenger system with their lower speeds are charged for two slots or don't get track time at all from the infrastructure authorities. So, if the labyrinth of freight operators across the pond is going to do its bit to meet the modal shift targets set by the European Union, they're going to have to play by passenger rules. That necessitates a high-horsepower unit to go with the passenger flow at 75 mph.

"You might want to call the Euro 4000 the SD70 in a European shell. It's a dual-cab unit that employs a 16-cylinder 710 engine and will be offered first in D.C. and later in A.C. traction," says Garman. "One difference is that there will be freight and passenger versions, the latter geared for 100 mph and equipped with an HEP pancake generator. Production will be at the Valencia plant of Vossloh España, a builder we've partnered with for more than 50 years."

James A. Brown

Better known by its U.K. "Class 66" designation, EMD's 3,000-hp JT42CWR has been a European success story with more than 500 — many constructed in London, Ontario — delivered throughout the continent. One of the earliest Class 66 units, London-built EWS 66012 rolls freight northbound through Dent, North Yorkshire, on Sept. 17, 2005.

No one wants to wind up behind a sole-sourcing eight ball

Co-production partnerships such as this one are important additions to EMD's stable at home and abroad. One that is currently running strong stateside is with Wabtec subsidiary Motive Power Inc. Settling comfortably into its niche markets for GP15D and GP20D switchers and the MPXpress line of commuter power, MPI has been racking up orders that, customers say, have been heavily influenced by the presence of EMD prime movers and control systems underneath the skin of the Boise-built units. The reason? Operators know that by taking units with proven EMD components, they're getting power that's reliable and won't tack shop force retraining costs onto the tab.

If all of these successes aren't enough to convince armchair critics that EMD has the potential to really gallop, then there is one other factor that should be considered in contemplating the company's future. No one in Class I railroading today wants to wind up behind a sole-sourcing eight ball.

"That was a big factor in our decision to go with EMD," says CN's Fahmy. "It's absolutely critical that we have two reliable suppliers. We have a fantastic relationship with GE, but we don't want them to be our only source of motive power. With the new ownership at EMD and the latest SD70s, we've got two viable suppliers that are both putting great emphasis on quality and follow-up service."

While there may have been difficulties in the recent past, some observers don't think EMD has ever been out of favor to the extent of jeopardizing its existence.

That did happen to Alco and the result was that customers turned their backs on the builder, long-time motive power man and retired consultant Tom Harley says. "I'd say Penn Central's decision to take no more Alcos was the kiss of death. You haven't had that with EMD. When the likes of Union Pacific goes shopping for a solid, bread-and-butter locomotive and takes more than 1,000 SD70Ms, you have to believe their products are still dependable."

Others want to be convinced, but still haven't seen enough to render a definitive answer. Consultant Steve Petracek says it's hard to answer questions about the company's future "without knowing more about Electro-Motive's financial structure and the strategic goals of the new owners. Are the investors trying to make a quick return or do they want to develop a long-term asset?

It's a cliché, but only time will tell. And time — with its usual consort, timing — has always been on EMD's side. It was perfect timing by founder Harold L. Hamilton that started the whole Electro-Motive enterprise rolling in 1922. He recognized the untapped potential in the moribund market for gas-electric cars and delivered an innovative answer. That well-timed technology knocked down branch line steam costs and saved many runs from obliteration by the automotive juggernaut that was already roaming the land in the 1920s.

It was perfect timing to arrive on the scene with a new power plant that could sing its two-cycle siren song and cast a magical spell over the Depression-battered, fire-breathing business of railroading at a time when great hunks of it looked like they were going down for the count.

Pioneer Zephyr? FT demonstrator set 103? The pug ugly Geep? All sneered at in the beginning, but ultimately examples of fortuitous timing on the part of the people at EMD. If history is of any value in the take-no-prisoners world of railroading in the early 21st century, then it should teach us that EMD has always had a knack for being in the right place at the right time, even when the odds looked slim. Phoenix rising? I

Not Bad for a 42-Year-Old

Story by J. David Ingles

Sire of the great SD40/SD40-2 line, Electro-Motive Division's first-ever prototype SD40 is — amazingly, and there's no other word for it — still active in daily freight service for a Class I carrier after four decades.

Today she's IC 6071, toiling for Canadian National, which bought the Illinois Central in mid-1999. She's easy to miss, for she wears the solid black, with the "AT&T-style" emblem, that IC brought back in 1988 when it renamed itself from Illinois Central Gulf. That word "Gulf" is also important, because the always-thrifty Gulf, Mobile & Ohio was 6071's first post-EMD owner, for more than six years from May 1966 until August 1972, when IC merged with the parallel GM&O.

Like Canadian National has been, ICG was slow to repaint locomotives acquired in a merger or by other secondhand means, content to let nature take its course and spend money on a new paint job only when other reasons beckoned a unit into the back shop. So EMD's first SD40 ran around for a few years in the 1970s as bright-red GM&O 950, the number assigned to segregate her above GM&O's 22 bought-new "Big Red" SD40s of 1966.

If you can't remember numbers but know to look closely, 6071 is easy to spot as different. She lacks those notable front and back "porches" of SD40s, for her frame is five feet shorter than a standard '40 frame. Why? She has an SD35 frame, the stock item in July 1964 when EMD quietly outshopped her from La Grange as a prototype test unit. Numbered 434, she originally bore no other external identification and wore a paint scheme of a Santa Fe-knockoff: solid dark blue with a bit of yellow trim. Her simple dress was intended as a disguise to enable her to test unnoticed on the Santa Fe and elsewhere. Nevertheless, she and her usual company of other EMD test locomotives, and/or cars piqued the interest of observant trackside spotters.

"It was no secret that the venerable EMD 567 engine, introduced in 1938, was being taxed and turbocharged to the limit to produce 2,500-hp in the GP35 and SD35," stated Greg McDonnell, in "The Biggest News Since 1939" in Spring 2005 CLASSIC TRAINS, a piece on EMD's 1965 introduction of the 645 engine.

"Inasmuch as a 392,000-lb. locomotive can be kept secret, EMD had played its plans for a 567 successor close to the vest. By 1964, an unlettered six-motor hood unit numbered 434 ... was seen testing on Santa Fe freights. The mysterious C-C unit secreted the first locomotive application of the as-yet-unannounced 645, not to mention the builder's new AR10 alternator, the foundation of a new A.C.-D.C. transmission.

"The 434 had six new D-77 traction motors slung on its Flexicoil trucks, plus a host of technological and engineering innovations and improvements. The 434's anonymity belied that it heralded not just a new model — the SD40 — but an entire new generation of EMD locomotives," says McDonnell.

Like many units in the 21st century, IC 6071 owes her longevity to the economies inherent in constantly upgrading older reliable units as a hedge against the necessity of overspending for brand-new power. Like the 16 other former GM&O "Big Reds" that survived on CN's roster entering mid-2006, the 6071 was upgraded to Dash-2 standards by VMV in the old IC shop at Paducah, Ky., in 1995. To CN, No. 6071 is officially an SD40-2R and, except for her frame length, she's little different from her Big Red brethren in the IC 6050-6070 series: weighing 188 tons, sporting a 16-645E3 engine rated at 3,000-hp, capable of 71,000 lbs. of continuous tractive effort, and geared for 65 mph maximum speed.

Make no mistake, Canadian National knows the unit's pedigree, so it's highly unlikely she'll be scrapped. Sold or shunted off into a lease fleet? Perhaps. Donated to a rail museum? One would hope so, though that probably won't happen soon. IC 6071 is a free runner, based out of Woodcrest Shop in Chicago's south suburbs, and usually found on the old Illinois Central. But she is known to have strayed onto the former Grand Trunk Western, and probably has visited the old Wisconsin Central and ventured into Canada, too.

Not bad for a 42-year-old, eh?

Her drab EMD disguise replaced with a handsome dress of red and white, GM&O 950 — the first SD40 of all — leads "Big Red" sisters 913 and 903 through Williamsville, Ill., on July 3, 1970 (right). Still on the road at age 42 (top), the pioneer SD is now in the employ of Canadian National as IC 6071. On May 6, 2006, she leads sister 6117 out of Homewood, Ill., on southbound CN train M336.

Paul Burgess

J. David Ingles

Living Legends

A Tribute to EMD's SD40/SD40-2

Arguably the greatest line of second-generation diesels, the 3,000-hp, C-C SD40/SD40-2, launched by Electro-Motive Division in 1966 remained in production for more than 20 years. Its members numbered almost 5,600 units in several variations, including nearly 4,000 SD40-2s. The fact that thousands still serve in everyday heavy freight service in 2006 is testimony enough to the SD40's greatness.

—J. David Ingles

Magnolia night. Headlights and signals cut tracers in the Potomac River fog as color-position lights beckon CSX SD40-2 No. 8129 working eastbound on the former Baltimore & Ohio at Magnolia, W Va. — Photo by M. Ross Valentine

6738
6738
FIRE
EXTINGUISHERS
INSIDE
Railway

Three photos, Elrond Lawrence

Dynamics howl as BNSF 6738 West descends Cajon Pass at Devore, Calif., (left) leading a pair of sister SD40-2s and an NS SD50 on the morning of July 4, 2005. On a picture-perfect February 2005 afternoon, UP SD40-2 No. 3543 (top) pilots an SP-painted GP40 rebuild, and a UP GP15 -1 on the southbound Santa Cruz Local along the spectacular coast of Monterey Bay at La Selva Beach, Calif. Almost home, (bottom), the Santa Cruz rolls through the streets of Watsonville, Calif., a mile or so from its Watsonville Junction home base.

Greg McDonnell

Variations on a theme. A number of railroads ordered customized versions of the ultra-successful SD40/SD40-2. Southern and Norfolk & Western chose for high-nose/long-hood-forward units, such as NS No. 3269, a former Southern girl (above) on the UP at Bryan, Texas, in April 2006.

M. Ross Valentine

Greg McDonnell

Hundreds of SD40s and SD40-2s have found post-retirement careers in the employ of lease-fleet operators. Built in 1966 as UP 3018, Helm Leasing 6320 (top) wears the colors of Morrison-Knudsen, its first post-retirement employer, as it passes color-position signals south of Deshler, Ohio, with two CSX SDs and an auto rack train in September 2005. Decked out in a fresh coat of CIT blue (above), CEFX SD40-2 No. 3186 grinds up Cajon Pass with a UP Dash 9 and SD60M on a cement train at Canyon, Calif., in February 2006. Leased to UP, CEFX No. 3186 started life as BN 7100.

Shock Along the Susquehanna

by Kevin P. Keefe

Vintage diesels manage to hang on in various guises, but rarely as exquisitely as this. You're standing alongside the old Susquehanna Division of the Pennsylvania Railroad near Dalmatia, Pa., 39 miles north of Harrisburg, and in the gathering twilight of Sept. 30, 2005, comes a shocking sight: a pair of polished PRR E8s, Nos. 5711 and 5809, resplendent in keystones and Trainphone antennae, heading up a matched set of Tuscan red passenger cars flanked by stalwart Pennsy position-light signals.

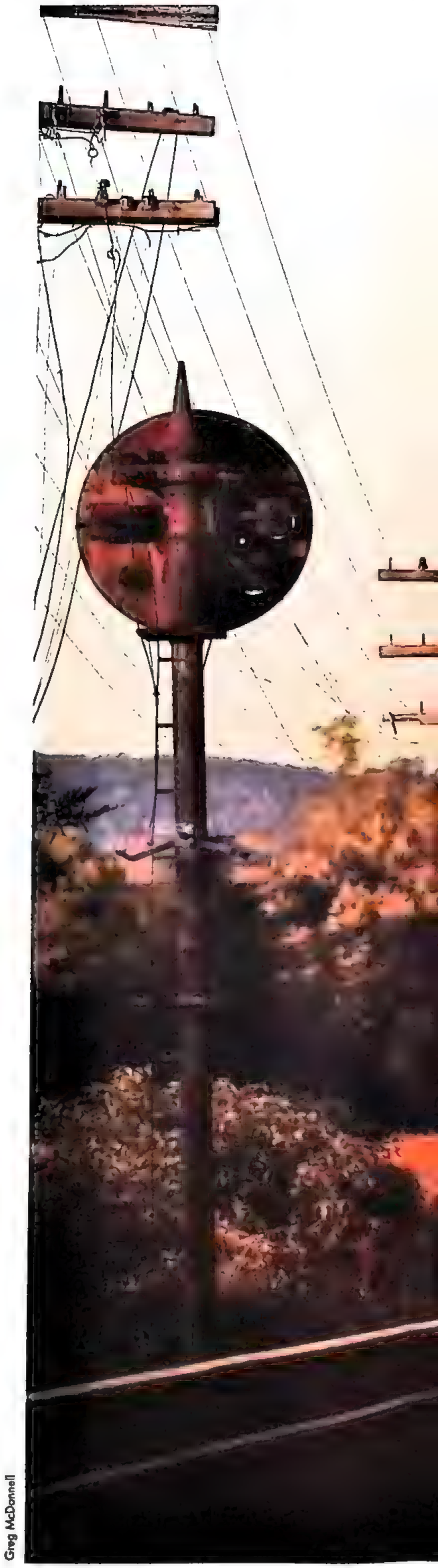
What in the name of the *Buffalo Day Express* is going on here? Isn't this the 21st century? Don't these tracks belong to Norfolk Southern? The PRR ceased to exist nearly 40 years ago. This route hasn't seen a regular passenger train for nearly as long. It must be a hallucination!

The explanation requires no leap of faith. The diesels and some of the cars belong to PRR preservationist extraordinaire Bennett Levin of Philadelphia. Other cars are from the NS business fleet. Together they are making a day-long circle trip out of Harrisburg via Altoona, Lock Haven, and South Williamsport, carrying members of the Lexington Group in Transportation History.

For the lucky passengers aboard the special, this trip will be a sweet memory on several counts. The train itself is remarkable, a once-in-a-blue-moon skein of Tuscan rolling stock punctuated by a theater-seat NS inspection car. The route is certainly exotic, offering 300-plus miles of mostly freight-only track amid the storied Alleghenies.

But for the cognoscenti on board, the day belongs to 5711 and 5809. Both are the real thing, bought from EMD by the Pennsylvania in 1951-52 as part of an order of 74 and, as such, constituting a second wave of E units that would help kill off the remaining K4s and M1s keeping the Pennsy in steam. Over the ensuing years, the two diesels would log millions of miles on who knows how many *Broadways*, *Generals,* and *Red Arrows*. In later years they would follow a Penn Central-Amtrak-Conrail trail that would deliver them happily into Levin's hands and into posterity.

So on this golden day, count yourself fortunate if you're among the throngs crowding the vestibules, straining to hear the 4,500-hp thrum of two-cycle engines, craning for a Dutch-door view of 5711 and 5809 putting their shoulders into Horseshoe Curve, tiptoeing through Tyrone, racing down the Susquehanna back to Harrisburg. At this moment, there is no Penn Central, no Amtrak, no Norfolk Southern—only a pair of gleaming, palpable reminders of the glory that was the Standard Railroad of the World.



Greg McDonnell

Shades of the *Baltimore Day Express*! In the gathering twilight of Sept. 30, 2005, Bennett Levin's exquisite Pennsylvania E8s Nos. 5711 and 5809 close in on position-light signals near Dalmatia, Pa., with "a once-in-a-blue-moon skein of Tuscan rolling stock."

5711
273N

The NEED

A meteoric streak of silver and blue bursts from behind the pillars in an adrenalin-spiking rush of whining electric motors and squealing brakes. Acela!

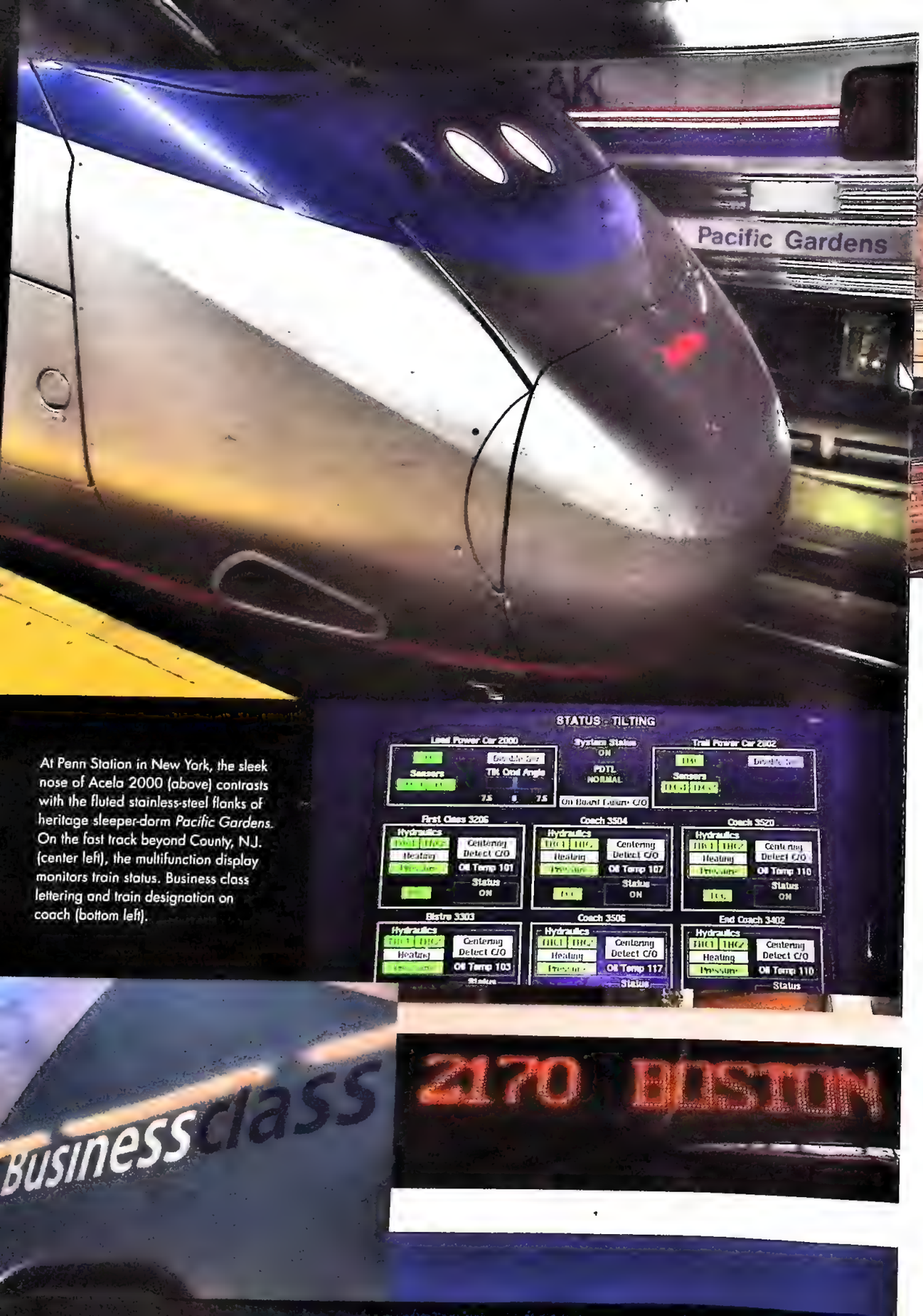
for SPEED

Story and photos by Greg McDonnell

Deep beneath the streets of Manhattan, the subterranean depths of Penn Station are energized with the excitement that only New York City can generate. Electric-blue flashes of arcing 650-volt D.C. lightning illuminate the darkness as strings of Long Island MUs feel their way along the third rail. Signals suspended from the ceiling twinkle like stars of red and green; silvery trains of New Jersey Transit "Arrow" MUs screech to a halt and unload hundreds Jersey commuters. Concrete platforms quake as heavy electric motors, Amtrak AEM7s and imported NJT ALPs, rumble into the station with intercity trains and locals in a seemingly endless parade that surely couldn't get any more exciting.

And then it does.

A track crew climbs up out of the darkness and onto the platform. A signal flicks to green. Polished rails and catenary catch the glint of an approaching headlight, and then ... WHAM!



At Penn Station in New York, the sleek nose of Acela 2000 (above) contrasts with the fluted stainless-steel flanks of heritage sleeper-dorm *Pacific Gardens*. On the fast track beyond County, N.J. (center left), the multifunction display monitors train status. Business class lettering and train designation on coach (bottom left).

The fastest trains in North America, Amtrak's 150-mph Acela Express trains were introduced in 2000. The excitement hasn't worn off, nor has the appeal of premium service covering the 457-mile Boston-Washington Northeast Corridor in as little as 6 hours, 29 minutes up to 15 times a day each way.

Built by the Bombardier Alstom Consortium and assembled at Bombardier's Barre, Vt., facility, each of the 20 electric-propulsion Acela high-speed trainsets typically consists of six cars — a First Class car, two Business Class coaches, a Café ("Bistro") car and two more Business Class coaches. The trainsets are bidirectional with a "power car" on each end.

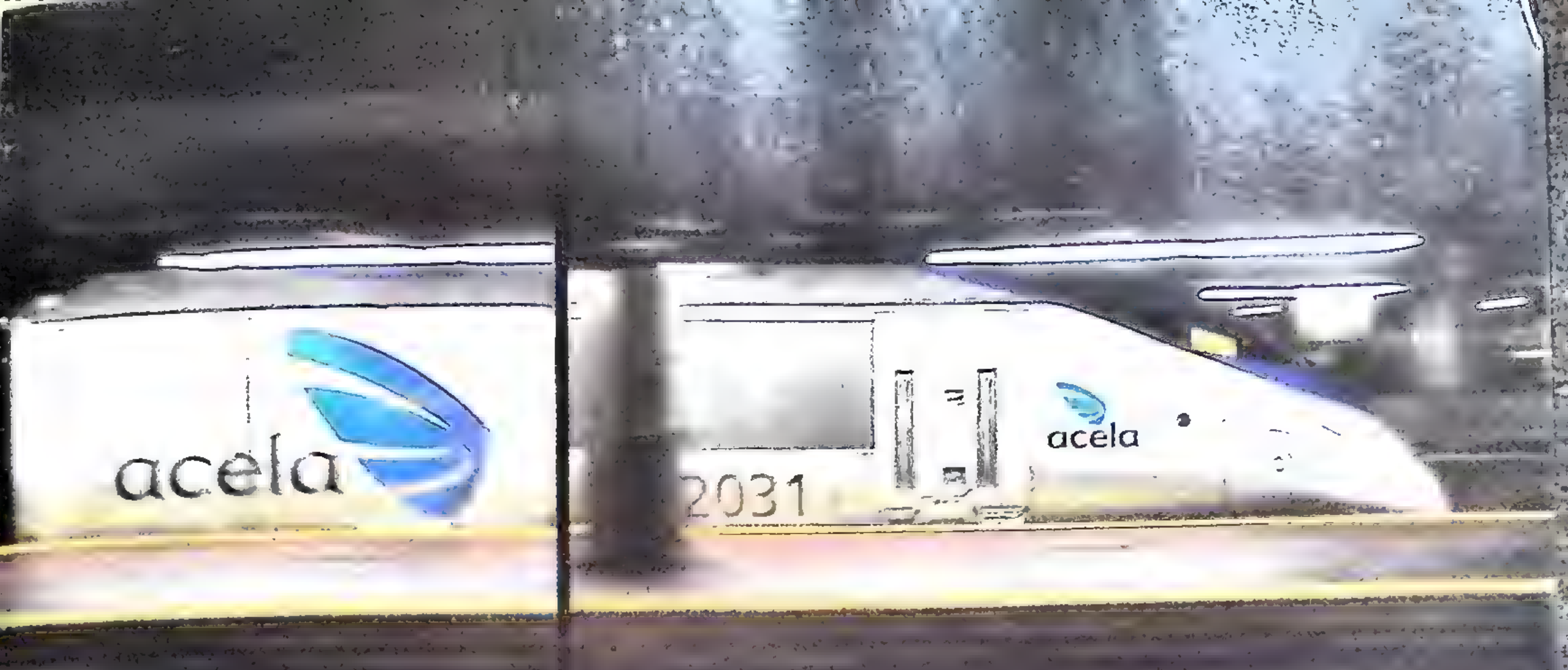
"They're not power cars, they're locomotives," insists Don Savidge, Amtrak's system general road foreman, despite Bombardier's official designation for the streamlined, four-axle Acela motors. And they're impressive locomotives at that.

Tipping the scales at 200,000 pounds measuring 69 feet, 7 3/8 inches over the pulling faces, the A.C.-traction Acela electrics are four-motor machines outfitted with three phase, four pole, induction asynchronous A.C. traction motors capable of a starting tractive effort of 12,375 foot-pounds. They're featherweights compared to the average freight locomotive, but, when it comes to performance, its like comparing a Lamborghini to a Mack truck. Rated at a continuous 4,600 kW (equivalent to 6,169-h.p.), Acela power cars are designed for — and have been tested at — speeds in excess of 165 mph. Amtrak reins them in at a maximum speed of 150 mph.

In the cab of Amtrak 2000, class engine of the 40 Acela motors (Nos. 2000-2039), engineer Dave Byrnes is set to make the most of the 12,338 horsepower at his disposal just as soon as Washington-bound train 2155 gets the highball to depart Penn Station. At the stroke of 11 a.m., he grabs a fistful of kilowatts and No. 2155 is on the move. On time.

Clattering through a maze of crossovers, the train slips briefly into daylight as it glides over the last bit of open-air trackage in Manhattan, then plunges into the North River Tunnel. Making a mile a minute, No. 2155 rifles under the Hudson and breaks into the blinding sun on the Jersey side. Acceleration is remarkably smooth and rapid, as Byrne effortlessly takes the *Acela Express* to 90 mph.

The sprint is tantalizingly short as Byrne soon slows the westbound Acela for speed restrictions at the moveable bridge over the Hackensack River at Portal, for Dock Interlocking, the Passaic River bridge, and a station stop at Newark. The fastest track on the



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Glistening in the setting sun, Acela 2028 (above) arrives at 30th Street Station in Philadelphia with Boston-bound train 2172 on March 29, 2006.

corridor — and the continent — is between Boston and New York, where several sections are carded for 150 mph Acela operation. Between New York and Washington, top speed is 135 mph.

Like all modern locomotives, the Acela power cars are complicated machines with high-functioning microprocessors managing and monitoring all systems, and their every move. Byrne has it all at his fingertips on a series of screens across the control console: cab signals, speedometer, and a primary operating display, along with multifunction display screens.

The primary operating display (POD) includes an "intelligent active speedometer" that provides not only analog and digital speed readouts, but speed-related information, from cruise-control settings (that's right, cruise control) to real-time maximum authorized speed linked to cab signals as well as a transponder and radio-based control system. The POD also serves as a crew alerter and provides a host of operational, train-status, and warning indications from time of day, to truck hunting, open doors, and loss of cab signal communication.

Multifunction displays provide dozens of screens, pages, and options related to operation and status of, not just the power cars, but the entire train. Everything from air-brake pressure to system status, truck surveillance, and car-by-car maintenance events and history. The main operation page provides tractive-effort metering and air-brake pressures for the lead and trailing power cars, along with train status and alarms. There's even a speedometer-check function: "Hit Start on First Milepost ... Hit Stop on Second Milepost."

Cab signals displaying vertical greens, Byrne winds out on the 2000 exiting Newark for the fast track. Passing NJ Transit locals like they're standing still, the *Acela Express* lives up to its name; hitting 110 west of the interlocking at Hunter, backing-off for the S-curves through Elizabeth, and slamming past an eastbound led by HHP-8 class-engine 650. The

speedometer climbs to 125 beyond Elmora, dropping to between 95 and 110 mph for "slow" curves between Union and Lincoln.

Approaching Penn Station in Newark, N.J., HHP-8s meet as Amtrak 652 on train 180 encounters sister 654 departing westward with train 185 on March 29, 2006. Engineer Jim Hardy at the throttle of Amtrak 652 on train 180 (below), makes a demanding job look easy.

At County, 32.8 miles out of Penn Station on the old Pennsylvania Railroad "Broad Way," Byrne and the Acela finally get to strut their stuff. The effort meter, measuring tractive-effort in "Lbs x 1000," digs deep: 15 ... 20 ... 30 ... 38; 38,000 foot-pounds, as the motors guzzle current from the 12kV/25Hz overhead. The speedometer climbs in correspondence: 122 ... 125 ... 130 ... 133 ... 134 ... 135. *135 mph!*

Catenary poles zip past like fence pickets. The roadbed is a blur; position-light signals just streaks of color. Hell-bent for Washington, the Acela screams down the Broad Way at better than 2 miles per minute, honoring the legacy of the likes of *The Morning Congressional*, *The Washingtonian*, and *The Broadway Limited*, and putting an exclamation point on everything that's right about railroading.

The speedometer levels out at 136 mph (a 1-mph variation is permissible to compensate for instrument accuracy) and Byrne settles in his seat and smiles. The cab is quiet, the ride remarkably smooth, and No. 2155 is on time.

This is railroading!

All in the family

While Amtrak's Acela is the fastest thing on rails this side of the Atlantic, its cousin, the Bombardier Alstom Consortium HSEL (High Speed Electric Locomotive) is the most powerful locomotive in North America. Developed in concert with the Acela program, and assembled by Bombardier in Plattsburgh, N.Y., the HSEL is better known by its Amtrak designation: HHP-8. Designed to handle 125-mph "Regional" trains in the Northeast Corridor, the HHP-8 is a conventional electric locomotive. That is, if you can call a dual-cab, 222,000-lb, 6,000-kW (8,046-hp) four-motor, A.C.-traction beast conventional.

Powerful? "If you're not careful, these things can tear a train apart," says engineer Jim Hardy, notching HHP-8 No. 652 up to 123 mph as Amtrak train 180 rips through Midway, N.J. With 12 Amfleet cars in tow, the 652 barely flinches. Packed with many of the same microprocessor-managed systems, computer-assisted controls, cab signals, primary operating displays and multifunction display screens of the Acela, the HHP-8 is as high-tech as they come. Nevertheless, Hardy is the brains of the operation. "It still takes a lot of heads-up train handling," he adds, instinctively nudging the throttle and calling the clear signals beckoning the New York-bound speedster.

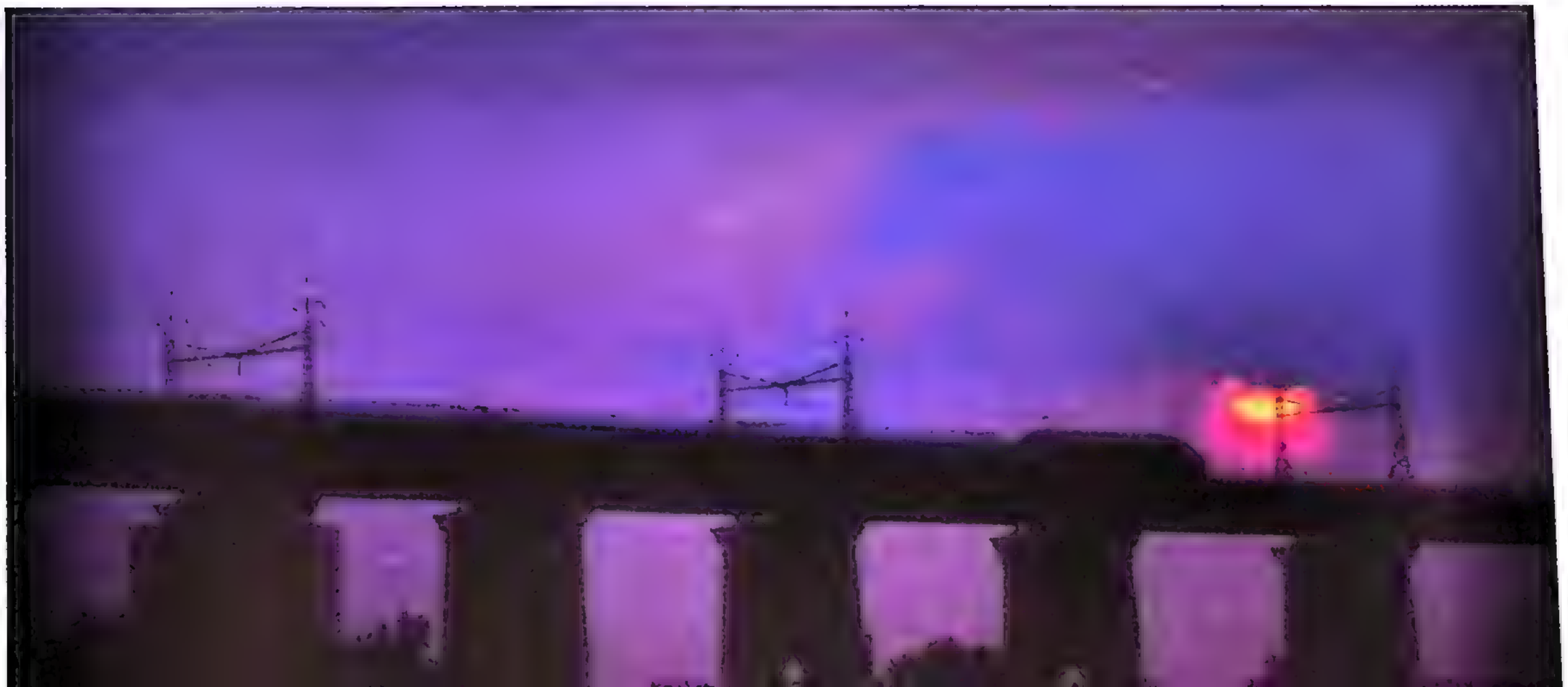
Coincident with the acceptance of Acela trainsets, Amtrak took delivery of its 15 HHP-8s in 1999-2000. (Maryland's MARC has a half-dozen

of its own HHP-8s, acquired in 2002 for commuter service in the Baltimore and Washington, D.C., metropolitan regions.) Despite extensive trials and testing, their performance out of the gate was less than stellar as electronic glitches took their toll. Like any thoroughbreds, they're entitled to their temperamental moments, including those beyond anyone's control. "They're sensitive to rail conditions," notes Hardy. Translation: slippery when wet.

The curse of any electric locomotive that sets foot on the Northeast Corridor is the inevitable comparison with the Pennsy GG1. Esthetically, the HHP-8 can't hold a candle to the sculptured Lowey lines of the stylish G. The Bombardier-Alstom carbody is sleek, simple, and all business.

The HHP-8 may never live up to the legend of the famed 2-C+C-2 Pennsy motor, but it has a rock-solid ride and an air-conditioned, clean, quiet, and rattle-free cab. It can accelerate fast enough to push you back in your seat, make 125 mph with a 12-car train and stop on a dime (metaphorically, at least), with a blended, electro-pneumatic braking system. You could never do that with a GG1. 1

Minutes from Manhattan, HHP-8 No. 652 calls on Penn Station, Newark, with train 180 on March 29, 2006 (above). Set against a dramatic summer sunset (below), the double-ended profile of an HHP-8 forms a distinctive silhouette as Amtrak train 178 cruises over the Hell Gate bridge, crossing the East River between Queens and Manhattan.



Joe Greenstein

Remember the Rutland

Story and photos by Jim Shaughnessy

The Rutland Railway dieselized in 1951-52 with six Alco RS1s, nine RS3s, and a single GE 70-tonner. The storied New England road called it quits just a decade later, in 1962, and its green diesels were put on the block. The RS3s departed for Dixie and the Louisville & Nashville, but the little GE and several of the RS1s found work on portions of the Rutland that were revived as short lines. Nearly 45 years later, the Rutland is only a memory; much of its trackage and most of its diesels are gone.

However, among the few remaining Rutland survivors there remains one locomotive that has never left its home turf nor changed its colors — or even its road number — in its 55 year life. Still in service, Rutland RS1 No. 405 has changed owners, but continues to operate on Rutland rails.

Soon after Rutland's abandonment in 1962, F. Nelson Blount leased the Bellows Falls branch from the state of Vermont, which had acquired most of the right-of-way after abandonment, to locate and operate his Steamtown collection. The Green Mountain Railroad Corp. was formed as a common carrier to operate the excursion trains and any freight business that might develop.

The 405 was purchased from the Rutland estate and handled what freight traffic was generated in the early years of the operation, and was eventually joined by two S4s from the Delaware & Hudson and two RS1s from the Gulf, Mobile & Ohio. When Steamtown moved to Scranton, Pa., Green Mountain continued operating passenger excursions using the 405, while obtaining secondhand EMDs to deal with an expanding volume of traffic. In May 1997, GMRC merged with the Vermont Railway to form The Vermont Rail System, which now operates most of the remaining Rutland trackage in Vermont.

In recent years, the 405 has been modernized by her mentor, Walpole shop foreman Scott Whitney. She rides roller-bearing trucks, has a 26NL air brake system and revised electrical circuitry, including standard

AAR 27-pin MU. She sports sealed-beam headlights, ditch lights, and other refinements. But she's all Alco — complete with a robust McIntosh & Seymour 539 under her hood — and very much the Schenectady girl delivered to the Rutland in November 1951.

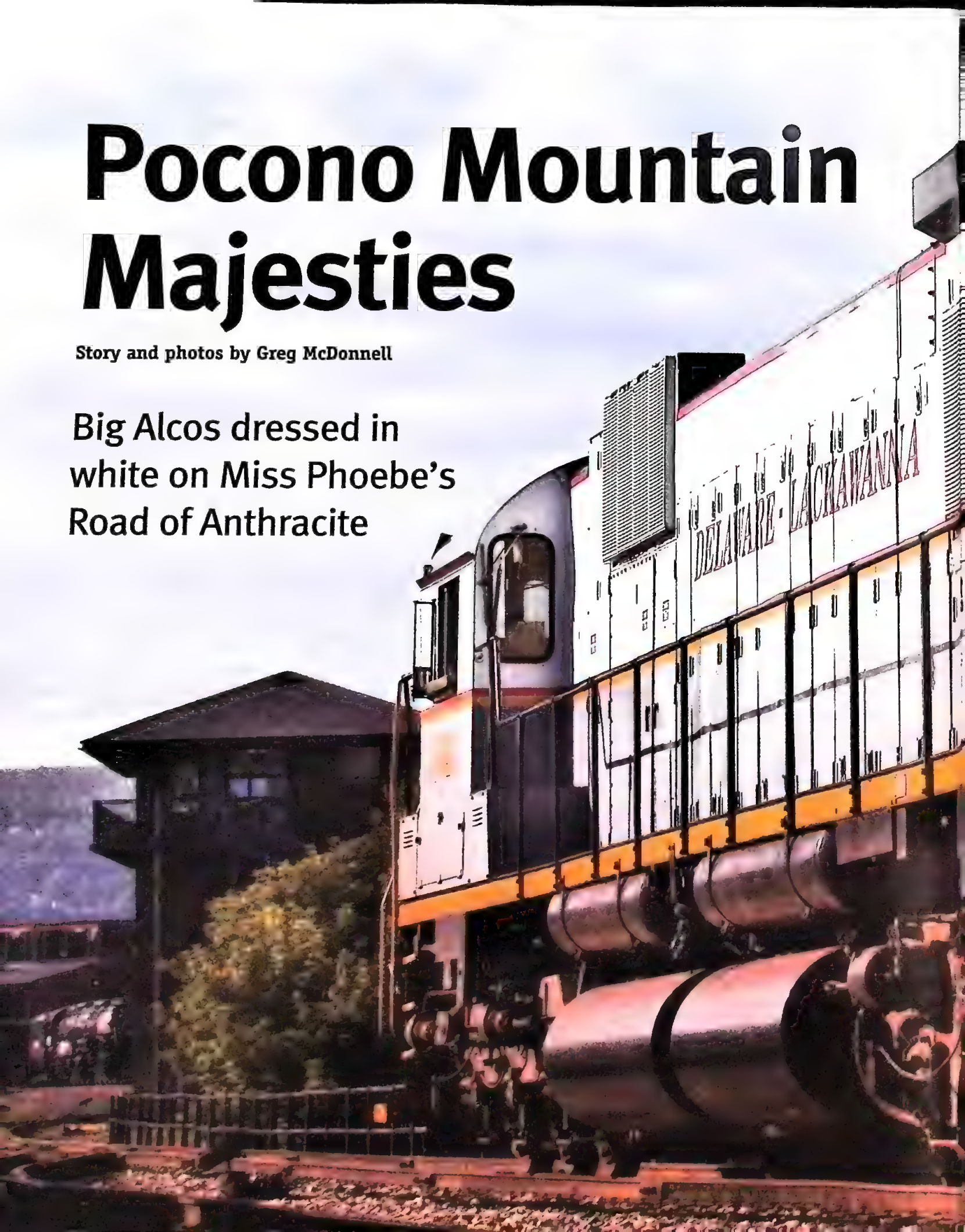
Christened *F. Nelson Blount* in honor of her benefactor, she's used regularly on passenger trains and sometimes fills in on switching and snowplow assignments. For the last RS1 operating in regular service on a commercial railroad in New England, the older she gets, the better she gets!

A living Rutland legacy, Green Mountain RS1 No. 405 passes the covered bridge at Bartonsville, Vt., with the *Green Mountain Flyer* on Oct. 7, 2003 (above), and crosses the Connecticut River (left) on the former Boston & Maine Cheshire Branch bridge, at Bellows Falls, Vt.

Pocono Mountain Majesties

Story and photos by Greg McDonnell

Big Alcos dressed in white on Miss Phoebe's Road of Anthracite



"the" DELAWARE LACKAWANNA RAILROAD CO. INC.

"They're old. Tired iron, all of 'em."

Champing hard on an unlit cigar, engineer Richard Janesko notches out the throttle of Delaware-Lackawanna M636 No. 3643. They're good engines, he's quick to add, casting a glance back at trailing units M630 No. 3000 and C425 No. 2461, as if they might be listening. Alco 251s call out in intensifying response to each progressive notch as Janesko widens the throttle, and the elderly trio digs in to get eastbound DL road freight PT98 out of Scranton, Pa., on a hot July morning. There will be no further talk of age or tired iron as the old girls go to work on the legendary Pocono grades of the former Delaware, Lackawanna & Western main line.

Looking east to the mountains, DL M636 No. 3643 basks in the morning sun at Bridge 60 in Scranton, Pa., ready to work train PT98 over Miss Phoebe's main on July 19, 2006. In the distance, another big Alco, UP Big Boy 4012, rests on display at Steamtown.

Who but Genesee Valley, these days, would dare paint Alcos white? DL No. 3643, formerly CP 4743, makes a splendid sight in the morning sun at Scranton in July 2006.

The Lackawanna never owned a six-motor Alco. Nor, for that matter, did the Erie, or the Erie Lackawanna. Nevertheless, the former DL&W main between Scranton and the Norfolk Southern connection at Slateford Junction, Pa., owned by the Lackawanna County Rail Authority and operated by Genesee Valley Transportation subsidiary Delaware-Lackawanna, is the domain of three DL Big Alcos.

The only six-axle locomotives in the 30-unit fleet shared by GVT's four short line operations in New York and Pennsylvania, the three big Alcos were purchased specifically for use on Delaware-Lackawanna's 59-mile Pocono Main, where they work hand in hand with DL's company of four-motor Alcos and MLWs. DL's other trackage, portions of the onetime Delaware & Hudson Penn Division main to Pittston and Carbondale, along with a scenic industrial spur on the old Laurel Line, are the province of 4-motor power.

Like all DL locomotives the big Alcos are of disparate origin. Two were built by Alco's Canadian affiliate, Montreal Locomotive Works; the third is a Schenectady graduate. First to arrive, DL M636 No. 3643 was built in November 1970 as CP Rail 4743, and sold to GVT in 1995. Newcomer M630 No. 3000 was turned out of MLW in December 1970 as Pacific Great Eastern 706. Traded in to General Electric in 1991 by PGE successor BC Rail, the 706 was retained by GE for use at the former MLW plant in Montreal, then owned by GE. With the closure of the Montreal facility, 706 was moved to Erie, Pa., and reconditioned for use on GE's test track. Still dressed in GE red and grey, the M630 was acquired by GVT in August 2005 and renumbered DL 3000 in accordance with the company's horsepower-based numbering system.

Alco-built C636 No. 3642 started life in March 1968 as Penn Central 6342 and moved to Delta Bulk Terminals in Stockton, Calif., in 1982 after being retired by Conrail and sold to dealer Chrome Crankshaft. The big 636 joined the DL stable in 2002 after two decades in California. Pride of the fleet, she's just recently been painted in GVT's attractive Alco demonstrator-inspired white and grey paint scheme to match sister 3643.

Sitting in the cab of the freshly painted C636 in his South Scranton shop, GVT Chief Mechanical Officer Don Colangelo beams with obvious pride. The 38-year-old locomotive, he insists, works better now than the day it rolled out of Schenectady. Extracting a reconditioned blue card from a neatly rewired and impeccably clean electrical cabinet, patting his hand on a replacement control stand, applauding the virtues of the 251 engine, and praising the work of his skilled shop staff, Colangelo rhymes off the prescription for rehabilitating tired Alcos. He should know. Few men, if any, know Alcos better than Don Colangelo.

Even in the low light of the crowded shop, the 3642 fairly glistens in white and grey, her Delaware-Lackawanna

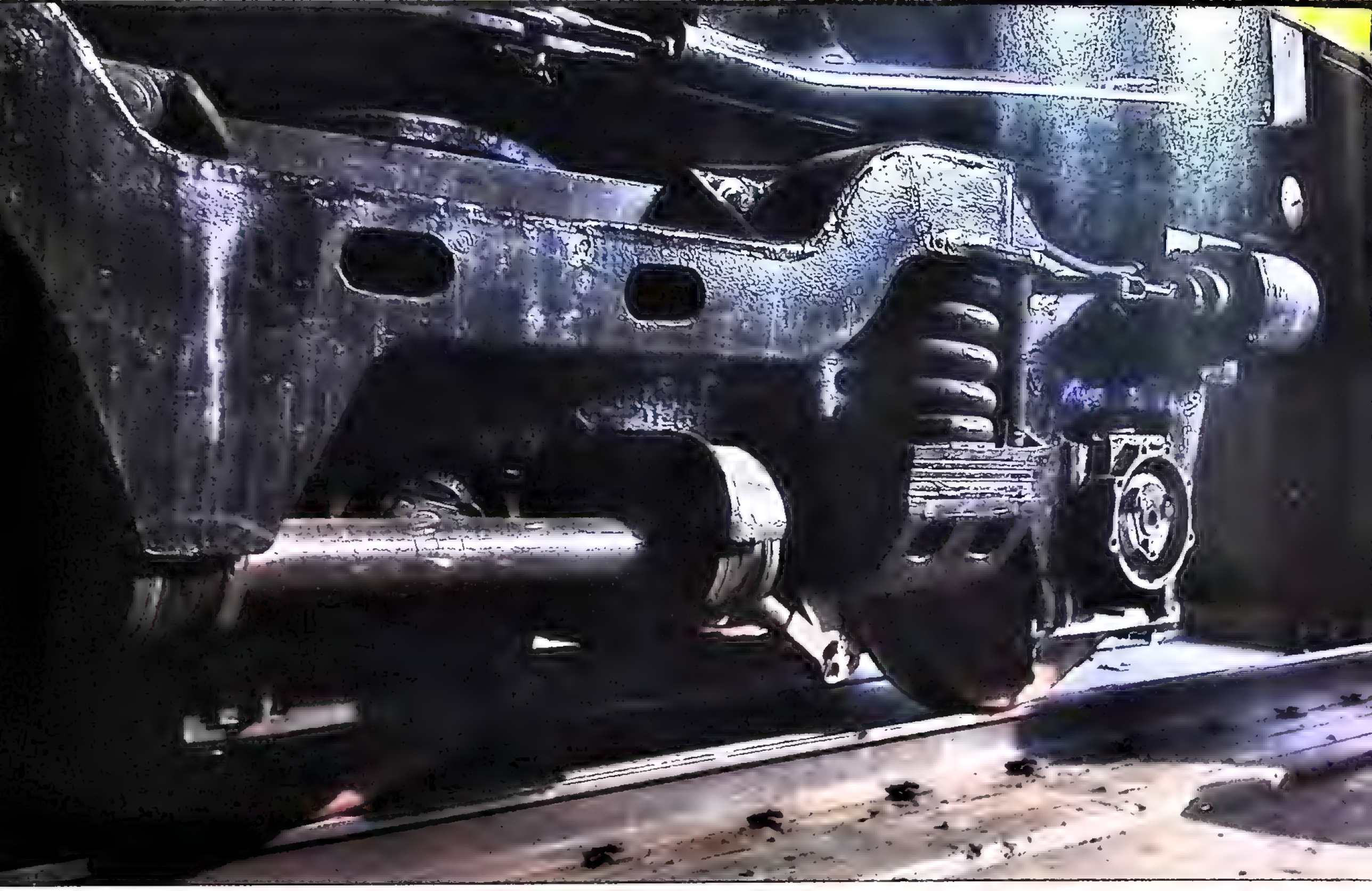
Scott A. Hartley

look — and life — the antithesis of the dark days of her youth. Born of a bankrupt builder and delivered to an all-but-broke Penn Central, she entered the world wearing somber black.

Among the last locomotives outshopped from Schenectady before Alco shuttered its doors for good, she was orphaned before she was a year old; Penn Central went bankrupt before her second birthday. Conrail gave her a brief reprieve, a new road number, and a pretty dress of blue, but by age 10, staying alive and one step ahead of the ivory hunters was the best she could do. While most of her kin went to scrap, she found refuge in California in the employ of Delta Bulk Terminals in the Port of Stockton in 1982.

After two decades of little work and less attention in Stockton, she arrived in Scranton with flaking

Pristine. Freshly painted DL C636 No. 3642 bursts from the Nay Aug Tunnel (above), working eastbound train PT98 with sister 3643 on May 7, 2006. Their days in Penn Central black but a memory, RS32 No. 2035 and C636 No. 3642 slumber in the South Scranton shop (bottom) in July 2006.



3642
3642

ALCO

The early morning sun streams into the South Scranton shop, highlighting the rugged features of DL 3642's Alco Hi-Ad truck (upper left), while the big 636 (lower left) awaits servicing.
Iconic. Opened hood doors expose the 16-251 Alco engine in M636 No. 3643. Riding the Road of Anthracite (above), DL 3643 approaches the Delaware Water Gap with PT98 on July 19, 2006. Load meter spikes (detail) as big Alcos dig in on Miss Phoebe's Pocono Mountain main.

paint and rust-streaked flanks, moss growing on her gangways and big Hi-Ad trucks, contaminated fuel in her belly, and beset with a host of ailments. Colangelo and the boys put her on the road, worked out the bugs, and worked in remedies and refinements. "Anyone can get an engine to run," he says. "We make them perform!"

And perform they do.

In an ear-splitting, heart-throbbing crescendo of Alco exhaust, Janesko marches PT98 uphill out of Scranton, blasting through Nay Aug tunnel, twisting and turning through rock cuts, ducking beneath the rusted steel trusses of abandoned Erie trackage, and shaking derelict concrete interlocking towers to their very foundation. Beckoned by the vacant stare of rusting, lobotomized Lackawanna signals, M636 No. 3643 — majestic in GVT white — leads the charge to the Water Gap, hammering through Elmhurst, and Moscow and Lehigh; Gouldsboro, Tobyhanna, Pocono Summit, and Cresco; knocking off miles still counted by cast-iron DL&W mileposts that measure the distance to Hoboken, N.J.

By any measure, it's spectacular railroading, as compelling as any conducted on Miss Phoebe's mountain stage since iron rails rolled in Scranton mills were spiked eastward to the Delaware Water Gap in the mid-19th century. If anything in dieseldom can rival the performance of DL&W's "Pocono" 4-8-4s in their namesake mountains, surely it's the 251-powered, six-axle beasts dispatched from Scranton under the Genesee Valley flag. And, if anything in 21st century railroading can be considered miraculous, surely it's the sight and incredible sound of big Alcos dressed in white on Miss Phoebe's Road of Anthracite. I

70 Tons of Personality

Story and photos by Ted Benson

"Welcome to the M&ET — the railroad with no personality!"

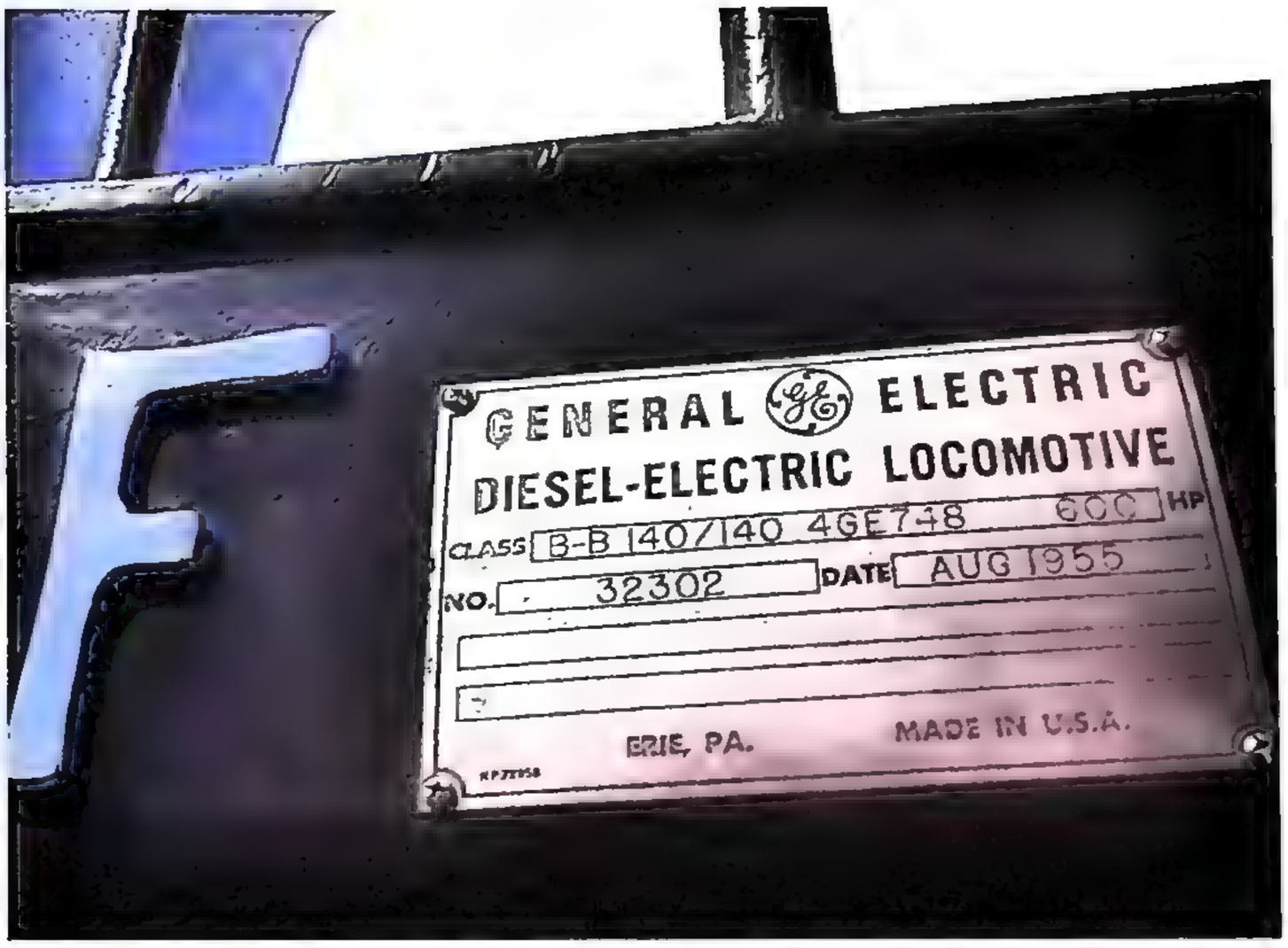
To the uninitiated enthusiast, the wry remarks of a Modesto & Empire Traction Co. crewman seem to make sense. At first glance, the table-flat switching railroad threading the Beard Industrial District between Modesto and Empire, Calif., appears to be an uninspired collection of power lines, storage tanks, and concrete tilt-up warehouses. Tucked away amid the factories on South McClure Road, M&ET's operating headquarters looks like any other industrial edifice.

It is only after encountering the south end of the north-facing diesel shop that one beholds the reason for the twinkle in the railroader's eye and the smile in his voice: It's the sight and sound of a yard full of Cooper-Bessemer prime movers idling inside a remarkable collection of red-and-white diesel locomotives.

Personality?

The M&ET has *tons* of personality — 70 tons per locomotive, in fact — 700 tons of available operating horsepower with another 700,000 pounds of potential waiting in the wings. For aficionados of General Electric's quintessential end-cab switcher, there is no place on earth like the Modesto & Empire Traction Co.

As reported in the June 2006 TRAINS, GE's shortline icon is fading fast. Of 238 units built between 1946 and 1958, less than 24 remain in common carrier service in the U.S. and M&ET rosters 10 active units with five more set aside for either rebuilding or parts. Still considered "the right engine for the job," infrastructure issues dictating light power have long been addressed since



Engineer Frank Cottle takes a coffee break on the M&ET 7 a.m. job (left) at Empire, Calif., on June 23, 2006. Builder's plate detail (above) on M&ET 608, originally McCloud River Lumber Co. No. 1. M&ET 606 and 603 (below) work the 7:45 a.m. job at Modesto's Riverside Yard on June 23, 2006.

No. 600 arrived new in October 1947. Primarily a boxcar road, increased carloadings and an emerging bulk traffic business underscore the need for larger locomotives. The GEs won't vanish overnight, but they won't last forever.

For now, "M&ET" still connotes gleaming 70-tonners sporting 50-plus-year-old builder's plates and generating tractive effort atop friction bearings — a railroad where sights like ex-Southern Pacific unit 606 sharing MU cables with a sister originally invoiced to Cherry River Boom & Lumber are as common as blue skies in June. M&ET is a railroad where "modern and efficient transportation" begins behind the drawbars of certified museum pieces — a carrier whose reverence for its "old soldiers" is proudly displayed 24 hours a day, five days a week.

Personality? It's all in the eyes (and ears) of the beholder.

Forever Young

by Greg McDonnell

The standard-cab General Electric Dash 8-40C is, for my money at least, the zenith of the classic American hood-unit design. It's the ultimate expression of the concept introduced by the Alco RS1 — if not by the 300-hp, Bush Terminal hoods born on GE's Erie, Pa., erecting floor in 1931.

The angular, substance-over-style Dash 8 design also created not only one of the meanest-looking machines on rails since the last pump-faced Northern Pacific Z-5 Mikado was shoved toward the blast furnace, but an ageless look.

Consider Union Pacific Dash 8-40C 9128 as she hurries a westbound manifest along Cajon Boulevard on the outskirts of San Bernardino, Calif., on Feb. 3, 2006. Save for some road grime, her looks are indeed ageless. But the December 1987 date etched on her builder's plate says otherwise.

Never mind all that. Pushing 20 years, No. 9128 is oblivious to age. She's still at her fighting weight of 391,000 lbs; still capable of packing a 4,000-hp punch; still able to run with the best of them; and showing no sign of putting in for a pension any time soon. Forever young.

Greg McDonnell

Forever young. Union Pacific Dash 8-40C No. 9128 hurries a westbound manifest along Cajon Boulevard on the outskirts of San Bernardino, Calif., on Feb. 3, 2006.

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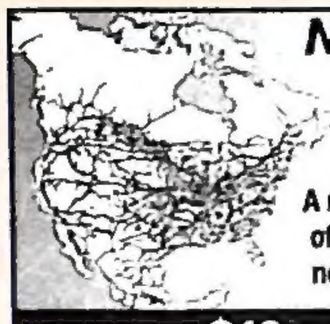

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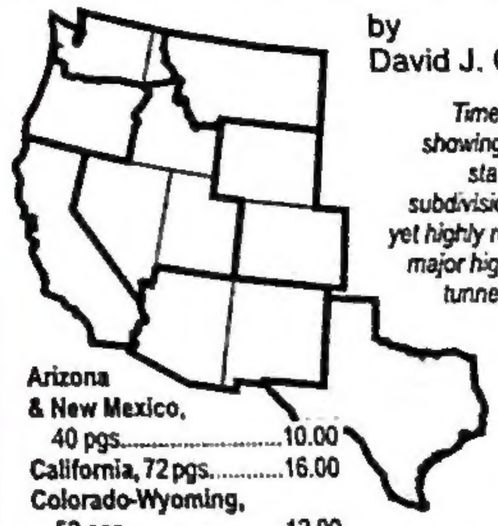

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The Sweetest Music This Side of Heaven

by Greg McDonnell

At the close of a year in which I learned to never say never, I expected 2005 to go quietly into the night. At least as quietly as the circumstances would permit, considering that old friends Stan Smaill and Phil Mason were arriving on VIA Rail Canada train 73 on the 31st for a New Year's visit. Certainly, though, this year — the year of the unexpected if ever there was one — had no more surprises up its sleeve.

I was wrong.

By the time Stan and Phil stepped off No. 73 at Brantford, Ontario, there was a matter of urgent business at hand. Alco business.

Jeff Willsie, Canadian Pacific Railway engineer and Ontario Southland owner, was exercising the advantages of his dual positions to move freshly shopped OSR RS18 No. 182 and RS23 No. 504 from Woodstock, Ontario, to OSR's operation at Guelph Junction on his regularly assigned CP train, the London Pickup. This would be no ordinary move. Lifting the units at Woodstock, Willsie would be putting his locomotives on the head-end, and working them to the Junction. Seven and a half years after CP MLWs made their last stand, Alco power was returning to CP's Galt Sub ... if only for a curtain call.

The players were no rag-tag survivors barely clinging to life, but pristine power from OSR's stable of well-kept Alcos and MLWs. Indeed, No. 182, bedecked with Christmas lights and an illuminated maple leaf, was fresh from a complete reconditioning and repainting at OSR's new shop on the former CP Port Burwell Sub at Salford, Ontario.

Greg McDonnell

Making a curtain call on a snowy stage, Ontario Southland MLWs, RS18 No. 182 and RS23 No. 504 — both Canadian Pacific veterans — sprint past the Orr's Lake mileboard west of Galt, Ontario, working CP's eastbound London Pickup on New Year's Eve, 2005.

So it was that I found myself with Mason and Smaill, standing in the snow at the Orr's Lake mileboard on the outskirts of Galt, Ontario, in the final hours of the final day of the year 2005 as the distant bark of Alco 251s heralded the approach of the London Pickup. There were no streamers or fireworks or strains of "Auld Lang Syne," and midnight was still 9 hours and 43 minutes away as the maroon and cream MLWs emerged from Barries Cut. With Willsie and his old Montreal girls on a snowy stage, we rang out the old — and ushered in the new — with raspy 251 vocals and the triumphant call of a K3LA horn. With all due respect to Guy Lombardo and his Royal Canadians, that was the sweetest music this side of heaven ... and a New Year celebration like no other.

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